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## TABLE OF CONTENTS

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### ORIGINAL ARTICLES

MENTAL CONDITIONS DISQUALIFYING FOR MILITARY SERVICE. *By Major L. Vernon Briggs, M.R.C., U. S. Army.* .......... 141
VAGINAL DISCHARGE IN CHILDREN; STUDY OF 255 SELECTED CASES, WITH SPECIAL REFERENCE TO THE QUESTION OF THE DIAGNOSTIC AND SPECIFIC VALUE OF SMEAR EXAMINATIONS. *By I. C. Rubin, M.D., F.A.C.S.,* New York. .......... 147
THE PRIMARY LESION OF TUBERCULOSIS; ITS SIGNIFICANCE, DIAGNOSIS AND TREATMENT. *By William W. Howell, M.D.,* Boston. .......... 152
LIPOIDS IN 131 DIABETIC BLOODS. *By Horace Gray, M.D.,* Boston. .......... 156

### MEDICAL PROGRESS

PROGRESS IN PEDIATRICS. A RÉSUMÉ OF THE LITERATURE OF INFANTILE SCURVY DURING THE PAST FIVE YEARS. *By John Lovett Morse, A.M., M.D.,* Boston. .......... 160

### BOOK REVIEWS

Kirk's Handbook of Physiology. By Charles W. Greene, A.M., Ph.D. .......... 164
Diseases of the Skin. By Richard L. Sutton, M.D. .......... 164

### EDITORIALS

MILITARY ANTI-TUBERCULOSIS PROGRAM PERFECTED. .......... 165
MASSACHUSETTS SOCIETY FOR MENTAL HYGIENE. .......... 167
WAR-RISK INSURANCE. .......... 167
MEDICAL NOTES. .......... 167

### CORRESPONDENCE

REPORTING OF ACCIDENTS FROM LOCAL ANESTHETICS. *Torald Sollmann* and *R. A. Hatcher.* .......... 173

### MISCELLANY

RESOLUTIONS ON THE DEATH OF MR. RUETER. .......... 170
INSTRUCTIVE DISTRICT NURSING ASSOCIATION. .......... 170
RECONSTRUCTION AND RE-EDUCATION OF UNITED STATES SOLDIERS. 171
COLD-PACK CANNING AND BOTULISM. .......... 171
THE MASSACHUSETTS VENEREAL DISEASE PROGRAM. .......... 172
NOTICES, RECENT DEATHS, ETC. .......... 174

## Original Articles

## MENTAL CONDITIONS DISQUALIFYING FOR MILITARY SERVICE.

BY MAJOR L. VERNON BRIGGS, M.R.C., U. S. ARMY,

*Senior Neuro-Psychiatric Service, Base Hospital, Camp Devens, Mass.*

In addition to cases of insanity and mental deficiency, all armies have to deal with considerable numbers of soldiers with hysteria and neurasthenia. The prevalence of these disorders increases greatly during war and at times of large mobilization.

In a recent letter from W. Maule Smith, M.D., Medical Superintendent of the West Bromwich Infirmary in England, he informs me that in Great Britain the British have four base hospitals for mental and nervous cases, *viz.*, two in England, one in Scotland and one in Ireland. The Canadians have one and the Australians have three such hospitals in Great Britain. All patients suffering from nervous and mental conditions are returned from France and are then drafted to these base hospitals, where they are reassorted and sent to smaller hospitals which are reserved for them. Cases which are still in the Army are sent to these base hospitals direct. If discharged from the Army while suffering from mental disease, they are sent to the county hospitals, but are paid for by the Government. "Most of these men that I have seen," he says, "are suffering from special sense derangement, taking the form of hallucinations of hearing and sight, also aphasia—or rather aphonia—lasting for a considerable time; amnesia and disorientation from the date of the casualty. The rule is that no case of mental disease resulting from fighting is certified in the ordinary way as insane."

From a still more recent letter from John Macpherson, M.D., Lieut.-Col. and President of the Medical Board, I quote the following: "Until recently all mental and nervous cases invalided from the expeditionary forces had been sent from France and other centers to this country (England). Recently, with regard to France, arrangements have been made for treating certain of the milder neurasthenics at base hospitals in that country. Cases occurring in Mesopotamia and Egypt can only be gradually transferred home after passing through base hospitals there and through hospitals in Malta, finding their way sooner or later to England. There are approximately 2700 beds in England, chiefly in asylums which have been converted into military hospitals. During their stay the patients in these hospitals are not certified. We are under promise to the country through the House of Commons to retain all overseas mental cases which are certifiable except, (1) general paralytics. (2) those with previous asylum history, and (3) bad epileptics. This applies only to those who have been with the overseas force.

"With regard to neurasthenics proper," Dr. Macpherson continues, "it is difficult to estimate the exact numbers. They are, as a rule, housed in special military hospitals, under special medical care. These hospitals have been converted specially for these cases. As the number of casualties increases and the number of men serving the colors also increases, there is a gradual increase in the number of neurasthenics; and, in proportion to the severity of the fighting and the increase in the use of high explosives, the number of neurasthenics and shell-shock cases varies. They include the following classes: (1) shell-shock, (2) neurasthenics, (3) functional paralysis, (4) tachycardia, (5) epilepsies, traumatic and idiopathic, with a sprinkling of hysterias and various other nervous disorders.

"If you estimate that, of all beds for military purposes provided in this country, five per cent. are allocated to mental and nervous cases, you will, I think, have a fair estimate of what you will have to provide."

The report of conditions at Halifax for August, 1917, shows that for each unit of 500 returned soldiers, 30 are tubercular, 25 nerve and mental, 70 amputations. On arriving at the Halifax discharge depot, hospital trains are in readiness for the unloading, and the mental cases, each with an attendant, are unloaded first and are sent to the insane hospitals at Coburg, Ottawa, Col. Alfred Thompson in charge.

Up to January, 1917, there have been approximately 300,000 troops sent overseas from Canada, of which 175,000 have seen service at the front. Of these there have been reported among the Canadian troops in England 4,316 casualties under the grouping of nervous and mental diseases, that is about 15 per thousand. It has cost Canada about $2000 per man to send her troops to the continent and return. It is easy to see what a mistake it is not to eliminate these mental and nervous soldiers, as far as possible, before sending the men overseas; as 13 per thousand of these men never got to the firing line. The nervous and mental casualties of Canadian officers and men were 2.38% of a total of 180,496 casualties of all kinds, including deaths, wounds in action and general diseases requiring admission to the hospital. They were made up irrespective of any question of discharge or permanent disability, such questions being determined at Quebec. Over 11,000 cases have been returned to Quebec and they are now coming in at the rate of 2,000 per month. From 4,000 general diagnoses of returned soldiers, made by the Medical Board at the Quebec discharge depot, a group classification is as follows:

| | |
|---|---|
| Gunshot wounds, all kinds ..... | 25% |
| Nervous and mental diseases .... | 12% |
| General medical diseases ....... | 12% |
| Tuberculosis .................. | 7% |
| Other cases ................... | 44% |
| Total ...................... | 100% |

Thus, in more or less permanently disabled soldiers, nervous and mental diseases divide second place with general medical diseases, and outrank, as they do in our Army, tuberculosis.

"The indetermination of the term 'shell-shock' has contributed to the confusion so common in military statistics on that subject. There seems now to be a strong temptation to designate as 'shell-shock' every medical case with nervous symptoms where the patient has been in the neighborhood of exploding shells. The tendency is to classify such disorders according to the apparent cause, without due consideration of the symptoms, course or, in many cases, the motive. A true concussion effect upon the nervous system, with organic changes, doubtless exists, and sets up symptoms similar to those of Oppenheim's grave traumatic neurosis. Surgeon-General Frothingham, who has been much in France, says that such cases are very rare. Most of the cases now denominated as 'shell-shock' present no features with which neurologists were not fully familiar under the terms 'hysteria' and 'neurasthenia,' and they carry with them the tendency to exaggeration and shamming so common in those neuroses. Near the firing line, the diagnosis of 'shell-shock' is made only when physical evidences of injury are also present or when the soldier's own statement as to what happened to him is fully corroborated.

"It is evident from the case records of returned Canadian soldiers that this new term is also made to cover various mental diseases, notably dementia-praecox, which existed before enlistment, and would have developed in due course without reference to military service."

On Aug. 1, 1917, the War Department issued, from the office of the Surgeon-General, Circular No. 22, which is, in part, as follows: "For the safety, efficiency and economy of the military service, it is highly essential that nervous and mental diseases be recognized at the earliest possible moment. Nervous and mental diseases may, and frequently do, exist in persons who are strong, active and apparently healthy, and who make no complaints of disability. Such persons are, however, less than useless as soldiers, for they cannot be relied on by their commanders, break down under strain, become an incumbrance to the Army and an expense to the Government. Disorders of this character are often demonstrable only as the result of a special and painstaking examination directed toward the mind and nervous system. This circular is published for the special purpose of calling the attention of medical officers to the particular diseases most frequently overlooked on general examination, and the symptoms most important to their diagnosis; and to certain characteristics in personality and in behavior, which might raise the question of mental disease.

Queerness, peculiarities and idiosyncrasies, while not inconsistent with sanity, may be the beginnings or surface workings of mental disease. A soldier is too important a unit for variations from a standard of absolute normality not to be looked into before the recruit who presents them is acceptable for service. To aid the neurologist and psychiatrist in these ways, the camp surgeon shall direct all medical officers, dental surgeons, instructors, hospital sergeants, barrack sergeants, and others who come in close contact with recruits, to refer to him or the camp surgeon all recruits who persistently show any of the following characteristics: Irritability, seclusiveness, sulkiness, depression, shyness, timidity, over-boisterousness, suspicion, sleeplessness, dullness, stupidity, personal uncleanliness, resentfulness to discipline, inability to be disciplined, sleep walking, nocturnal incontinence of urine, and any of the various characteristics which gain for him the name of 'boob,' 'crank,' 'goat,' 'queer stick,' and the like."

In detailing psychiatrists and neurologists to special duty with the armies, the Surgeon-General has had in mind (1) the proper care of soldiers who become incapacitated through mental and nervous disease, (2) the special examination of recruits in the training camps, in order that those who, because of neuropathic or psychopathic conditions, are unfit for military duty, may be identified and discharged from service.

Until the troops move abroad, the chief and most important responsibility of the military psychiatrists and neurologists will be the special examination of recruits. It is obvious that no man should be eliminated from the service who is fit to render a valuable service in this emergency. On the other hand, it is quite apparent that individuals suffering from certain forms of nervous and mental diseases should not be permitted to enter into service, as experience with the American armies has shown quite conclusively that such individuals are not capable of military service even in time of peace, and experience in the European armies has shown beyond question that such individuals are not able to withstand the rigors of modern warfare. At critical times they go to pieces, with the result that the military force is weakened, is hampered in the free performance of its function, and the Government is likely to be burdened after the war with the care of a large number of invalids.

It is important that the potential as well as the actual conditions of the recruits be kept in mind. It must be remembered that we have a perfectly definite situation to meet,—which is the elimination of men who, because of nervous or mental instability, are unfit for military service. Experience in the armies abroad shows quite conclusively that mental defect, *per se*, is often not sufficient cause for the rejection of a recruit. A previous history of insanity, epilepsy, chronic alcoholism, or spinal or cerebrospinal syphilis in any form, or a marked history of nervous instability, or difficulty of environmental adjustment over a long period, should be sufficient cause for rejection.

The duties of the pschiatrists and neurologists at the cantonments are two-fold:

1. Service at the base hospital, under the commanding officer of the hospital, for the care of nervous and mental cases, and for the examination of all cases referred for special examination by commanding officers, regimental surgeons, or others.
2. Service under the Division Surgeon, for the purpose of making general surveys of troops during group examinations or during small formations, and at other times, and selecting cases for special examinations, which give evidence of mental or nervous instability.

Co-ordination and quickness of perception must be gone into the examination of recruits when it is realized what the conditions are to which we are sending these men. For instance, when the enemy use many of the poisonous gases which have been creating such havoc among our troops, they must be capable of quick and intelligent action. Thirty per cent. of all bombs now used by the Germans and Allies are gas bombs. These include the paralyzing gases, that is, prussic acid, which is poisonous in one part to 10,000; and the lachrymating gases, ethyl-chloride, for example, which puts the soldier out of business when diluted 1 to 1,000,000. Then there are the cloud gases, such as chlorine or gas known as phostagen, which is a combination of chlorine and carbon monoxide. Two or three breaths of this gas bring on a chronic pneumonia which usually results in death in three to four days. The enemy bring this gas to the front in liquid form, confined in drums through which pipes are led toward the foe. When the wind is in the right direction the air is let into these drums, which vaporizes the contents, and the gas, being heavier than air, rolls over the surface of the earth and into the trenches and dugouts, in the form of a cloud, visible by day, but invisible at night. Gas masks, with the neutralizing chemicals attached thereto, render all the 12 or 13 gases used by the enemy harmless, but these masks have to be put on within six seconds from the moment the signal is sounded, else the damage is done and the soldier's death is only a matter of time; or if he has not breathed enough gas eventually to cause his death, he is rendered useless for further service—in other words, a man once gassed is considered fit only for civil life and is often not much good for that.

Quick action is again necessary in the handling of the hand-grenade. Holding one of these bombs in the right hand, the soldier has to remove a plug or cap, which automatically lights the fuse. If this bomb does not leave his hand and get away towards the enemy in four and one half seconds, he and his companions, or those near him, are blown to pieces. Once again: when the Allies are preparing for a charge or going over the top, a barrage of fire from the heavy artillery precedes their advance; the soldier has to be intelligent enough to time that barrage, and the barrages following it, so as to keep between them and not get into them.

Our examination of recruits at Camp Devens, which include the referred cases from over 30,000 men, have brought out the fact that the general practitioner has not been able to pick out many men whose mental condition disqualified them for service or who were mentally defective.

The Neuro-Psychiatric Unit at Ayer is composed of the following staff: Major L. Vernon Briggs, Capt. Morgan B. Hodgkins, and Capt. Douglas A. Thom. Two wards are nearly completed for this unit, and apparatus for hydrotherapy and electrotherapy installed; and a full corps of nurses and attendants and specialists in hydrotherapy and electrotherapy will soon be actively engaged in the care of neurological and psychiatrical cases referred from the Base Hospital of 1000 beds and from the infirmaries of the several regiments. In the meantime we are examining the recruits referred to us. It has been interesting to observe several well-defined cases of general paralysis coming out in the third decade.

When we started our neuro-psychiatric examinations we thought that neurology had but a small part to play in our service, but at the present time it occupies not less than 30 per cent. of all our cases. We find many cases of residual infantile paralysis, neuro-syphilis and epilepsy who have been holding responsible positions; and a large group of epileptics whose convulsions have not been of sufficient severity or frequency to keep them away from work, but which would render them unfit as soldiers.

We have also found many imbeciles who should be committed. Among the chronic alcoholics it has been interesting to note the frequency of convulsions; many cases who have had convulsions have not had delirium tremens, and some who have had delirium tremens have not had convulsions. We have been rather surprised not to find more malingerers, there being but comparatively few among cases referred to our clinic.

The method of examination of troops, be they referred or not, is neuro-psychiatric and covers seventeen questions, which take about six to ten minutes to go over. If these questions bring out abnormal conditions, a further examination is gone into. The seventeen questions are as follows:

1. Name.
2. Age.
3. Civil State.
4. Birthplace. (If of alien birth, length of time in States.)
5. Character and extent of education.
6. Nature of former occupations, and length of service in each. (b) Reasons for abandoning any given occupation.
7. Reasons for entering service.
8. Date of mustering in.
9. Attitude toward duties.
10. Attitude toward fellows.
11. Penalization for misdemeanors.
12. Consumption of alcohol.
13. Venereal infection.
14. Sleep (dreams).
15. Appetite.
16. Digestion.
17. Emotional tone.

This is always followed by a brief neurological examination whereby the tendon reflexes are tested in the usual manner, pupils examined for the accommodation to light and distance, the tongue, facial muscles and fingers tested for tremors. Station, gait, co-ordination, are all tested in the usual way. If any of these tests indicate that a further examination is necessary, it is, of course, followed up to determine the diagnosis.

Soldiers who have had this examination at Camp Devens to date have been specially referred to the Neuro-Psychiatric Clinic by regimental surgeons, regimental officers, headquarters division, and include disciplinary cases and cases from different services at the Base Hospital. To date these number over 500 cases, of which 372, or 75%, have been rejected as unfit for military service.

The rejected cases fall within one of the following groups: feeble-minded, epileptic, and the constitutional and psychopathic states. Two or more of these groups may be associated in the same case, that is, the epileptic may be primarily feeble-minded, and may eventually develop psychotic symptoms.

The four groups may be further divided as shown by the charts, which represent the work of this unit up to November 7. This represents over 1% of the entire 76th Division, and includes officers as well as enlisted men. It is fair to say that over 70% of the rejected cases might have been missed in a general physical examination, as given by the exemption board, but it is needless to say that such diseases as chorea, neuro-syphilis, hemiplegia and paraplegias and palsies should have been easily recognized and exempted.

About 50% of all the cases rejected, in the opinion of the members of the Neuro-Psychiatric Clinic, would be benefited by institutional treatment and care. It is obvious that these cases should be followed up, and endeavor made to institute proper treatment and care.

In closing I would like briefly to mention six cases which appear to us of unusual interest or of social significance.

Case 1. P. M. J., age 27 years, born in Plymouth, Mass. Student at Amherst Agricultural College. At the age of 11 was a student of nature and spent much time in the woods, observing the habits of animals. Acknowledged that he had gonorrhea, but denies syphilis. Referred to our clinic by the Company Commander, on account of statements made in the presence of officers, especially in regard to an invention which would revolutionize the running of automobiles. At our examination he stated that he could furnish the U. S. Army with meat at four cents a pound; that he had a million dollars which he could put his hand on tomorrow, which he could use as capital. He later confided to one of us that the million, and as much more money as he wanted, was in South America, waiting for him; that some woman was going to give it to him because of his invention regarding ice, which idea she had put into execution and made millions of dollars. He stated that he had interviewed hundreds of soldiers at Camp Devens and ten officers; also, the same number of soldiers and officers in England; that he added together their opinions as to war, struck an average, got the percentages, and had thereafter dismissed the whole question from his mind. He made other extraordinary statements and was somewhat threatening in his attitude when expressing his impatience at the officers for not giving him a hearing, and said that the hospital authorities were keeping him in the wards when he had so much important business to attend to. The Wassermann showed four-plus reaction. His case was diagnosed as general paralysis, and sent to the Psychopathic Hospital in Boston.

Case 2. H. N. B., 22 years of age, appeared complaining of severe tonic spasms in both the upper and lower extremities. These spasms were more severe when muscles were at rest, and passed off after passive movements had been exercised on the arms and extremities, so that after patient had used either arms or legs for any time he had little difficulty and no pain until they were put to rest. Neurological examination presented nothing worthy of note excepting a marked exaggeration of the deep tendon reflexes. Family history negative, with the exception that the patient claimed that mother and brother suffered from the same trouble. Diagnosis: congenital myotonia (Thomsen's disease). Although this case hardly falls within the realm of either mental or nervous diseases, it appeared to be of sufficient interest to justify reporting, inasmuch as the literature up to the present time reports only about 30 similar cases.

Case 3. W. F. M., 301st Infantry, born Feb. 9, 1899; went as far as the 8th grade in school, but at 14 was dropped on account of truancy. Has a brother in Bridgewater State Hospital for the Criminal Insane; has been arrested once for drunkenness in Dedham, twice in Boston, three times in Roxbury. Was seven years employed in a shoe factory, and was drafted to Ayer from his residence in Boston, Oct. 10. On the following Sunday at 2.30 p.m., he walked out of Camp and all the way to Boston, via Lowell and Arlington. He said that the men at Camp were framing him up and injecting electricity into him, especially into his legs. After one week at home, he told the brother of the U. S. District Attorney about the electricity, and how they tried to "get him" at Ayer with electricity. He was advised to see the District Attorney, who had him arrested, and he was sent to Fort Banks as a prisoner for desertion. I was ordered to Fort Banks to examine him, and found him somewhat demented, with hallucinations of hearing. He said that his thoughts came back to him by voices which he heard. He now believes that people are calling him names, especially "superstitious fairy." The voices also swear at him, and tell him the Federal authorities are trying to frame him up. He acknowledged being at one time in a Psychopathic Hospital, and inquiry at the Psychopathic Department of the Boston State Hospital reveals the fact that he has twice been an inmate of that hospital, and that his last discharge was under date of Sept. 20, 1917. Diagnosis: dementia precox, paranoid form; rejection recommended.

Case 4. F. E. D., single, age 24; born and resides in East Hartford, Conn. Went to 8th grade in school; says he went "crazy" over one George Cohen, an actor; although he hunted for him he never found him. Claims he was doped and laid up in New Haven, and that when he tried to get away they knocked his head on a cement floor. Gives history of residence at the Connecticut Hospital for the Insane, Middletown, Conn. Patient demented and somewhat excited. Was discharged by our recommendation, after diagnosis as dementia precox. After being paid off and his ticket bought he was left at the station, although we had recommended that he be attended to his home in Connecticut. He did not take the train, but returned to the hospital, and demanded that he be sent to the trenches to fight. On account of creating some disturbance, he was arrested and placed in charge of the Provost Marshal in the civilian jail in the camp. Here, at supper time, he drew a knife across his throat, and on this account, and on account of a newspaper reporter getting hold of certain facts regarding the case from the jail authorities, to save further publicity and to care better for the man, he was returned to the Base Hospital, and later sent to the Psychopathic Hospital in Boston in an ambulance.

In reply to an inquiry directed to the Connecticut Hospital for the Insane, Dr. Floyd Haviland, the Superintendent, wrote as follows: "F. E. D. was in our Hospital from Oct. 22, 1912, to April 15, 1913, being on the latter date discharged into the custody of his father as improved. At the time of his admission he was 19 years old. The onset of the psychosis was said to have been five weeks previous to the date of admission. He was first taken to the Hartford Retreat, where he remained until Oct. 18, 1912. According to the committing physicians, he imagined that he was a great athlete and made application to Yale College for the appointment as Assistant Doctor of Athletics. He took off his clothes in New Haven and tried to do various athletic feats on the street; was violent and smashed furniture in his room. The day after admission he was found lying in a nude condition on the floor, with all muscles tense, his extremities extended in a peculiar manner. When spoken to, he sprang up and moved about. He seemed to be dazed, and questions had to be repeated in a loud tone before he would reply. He stated that he had been doped by "George Cohen" and others. Sometimes he would stop in the middle of a speech, and look fixedly at some spot as if he heard someone. A few days later he was up and dressed, and spent much of his time standing in one place, drumming on the door and repeating senseless words or syllables. At night he usually covered his head with the bed-clothing. Physically, there was a positive Wassermann of the blood serum, there was slight inequality of pupils, knee jerks were absent, and there was considerable tremor of eyelids and protruded tongue. According to the records he was diagnosed dementia precox, catatonic form, with a possibility of dementia paralytica to be considered. According to the records he became more composed and for some time before his discharge he assisted in the work on the farm."

CASE 5. W. H. P.; arrested while intoxicated, for insulting an officer; three empty Jamaica ginger and one vanilla extract bottles found on him. He stated that he was released from Salem Jail, on condition that he report to the exemption board and accept service in the National Army. He says that he was arrested on July 18, 1917, and sentenced to three months in the Salem Jail; sentence suspended. Arrested again for similar offense about Aug. 12; received a three months' suspended sentence in the House of Correction, Salem. Was serving this sentence when his father received a pink card requesting him to report to the exemption board, Salem, Sept. 18. He said he was pardoned by the County Commissioners on the morning of Sept. 18, and sent to the office of the local board in Masonic Temple, where he said he was told by the chairman to report again on the 23rd, or else he would be sent to jail; this he did. He has been intoxicated twice since coming into camp. He began drinking at 16 years of age; the last six months has drunk about one quart of whiskey a day. Thinks he has been arrested at least fifty times for drunkenness and once for larceny of crackers from Boston and Maine freight car; has served two jail sentences for drunkenness in Salem, has been sentenced three times to Bridgewater State Farm and three times to Concord Reformatory. Was released from Concord in 1914 for one year, on condition that he go to the Norfolk State Hospital, which he did on Sept. 21, 1915, and was released Nov. 7, 1915.

CASE 6. F. S. Referred by Company Commander. Patient came under armed guard, having attempted to run away several times. Has on him the following paper, which he claims to have presented to the exemption board:

> "Bangor State Hospital, Bangor, Maine,
> August 19, 1917.
>
> "This is to certify that F. S. (correct name —— ——) has been a patient in this hospital from Feb. 17, 1914, to May 18, 1917. On admission he was 23 years of age; born in Russia; length of residence in United States unknown. During his residence in the hospital he was depressed, agitated, suspicious and suffering from hallucinations and delusions. During the last three months he improved and was allowed to leave the hospital on a six months' parole. Clinical diagnosis: dementia precox, catatonic type.
>
> L. F. NORRIS, *Acting Superintendent.*"

This case was rejected.

We have also referred to our clinic the so-called "conscientious objectors." These may be divided into four groups: (1) the objector who is really *conscientious*, who objects to taking life or entering into combative service, but who is willing to take up any other branch of service, including that of stretcher-bearer from the first-line trenches; (2) the *religious objectors*, including those calling themselves "Pentecostals," members of the Society of Friends (Quakers), Seventh Day Adventists and members of the International Bible Students' Association. Some of these religious objectors are willing to enter into the service as noncombatants; others refuse to become any part of the military service. (3) The ***Christadelphians***, who have now become exempted in England, providing they agree to engage in work of national importance, such as farming, factory work, etc. These men refuse to don military clothes or to salute an officer or do any military service, even service in military hospitals, and declare they would none of them raise a hand to save a soldier if he was dying and such an act would save him, because the soldier is part of the military system; (4) The *objector who is deluded*, whose abnormal mind has been swayed by stronger normal minds, and who is mentally diseased or defective, and must be promptly rejected.

Following is the classification of those rejected to November 1, 1917, but does not include some 30 whose papers have not been signed, pending the obtaining of histories or further observations in the Base Hospital:

| | |
|---|---|
| 1. Defective mental development | 164 |
| 2. Epilepsy | 92 |
| 3. Chronic alcoholism | 27 |
| 4. Dementia precox | 12 |
| 5. Constitutional psychopathic states | 17 |
| 6. Neurasthenia | 9 |
| 7. Chorea | 5 |
| 8. Manic-depressive insanity | 7 |
| 9. Hysteria | 4 |
| 10. Cerebrospinal syphilis | 3 |
| 11. Tabes | 2 |
| 12. General paralysis | 2 |
| 13. Drugs (morphine 6, heroin 1) | 7 |
| 14. Toxic psychosis | 1 |
| 15. Traumatic psychosis | 1 |
| 16. Hemiplegia | 2 |
| 17. Paraplegia | 1 |
| 18. Contracture | 1 |
| 19. Migraine | 2 |
| 20. Congenital myotonia (Thomsen's disease) | 1 |
| 21. Enuresis (exaggerated) | 2 |
| 22. Psychasthenia | 10 |
| | 372 |

These rejections were made from a total of 1324 officers and 27,482 men, the military strength of the cantonment to November 1. The total rejections to date for all causes have been 1 in every 8 of the draft sent to Ayer.

The figures I have given show only a cross-section, as it were, of our work resulting in the elimination of the mentally and nervously unfit, for our work is far from finished. At the present time we are having referred to us about 15 cases a day, and our percentage of rejections is greater as time goes on, because of the more intimate knowledge of the hospital staff and regimental surgeons of the kind of cases which should be referred.

# VAGINAL DISCHARGE IN CHILDREN; STUDY OF 255 SELECTED CASES, WITH SPECIAL REFERENCE TO THE QUESTION OF THE DIAGNOSTIC AND SPECIFIC VALUE OF SMEAR EXAMINATIONS.*

By I. C. Rubin, M.D., F.A.C.S., New York City.

[From the Special Clinic for Vaginitis in Children, Mt. Sinai Hospital Dispensary.]

The problem of vaginitis in children presents nearly as many difficulties today as before the gonococcus was discovered. Before the etiological cause of gonorrhea was established, vulvovaginitis of children was supposed to be due to a variety of causes, all of a non-specific nature. Soon after Neisser's discovery, the notion that vaginal discharge in small children was also venereal in origin became predominant. No longer was this to be treated lightly. An active local therapy was to replace the almost *nolle me tangere,* and both pediatrist and gynecologists recommended measures which had been found useful in the treatment of gonorrhea in adults.

In view of the general prevalence of gonorrhea, the incidence of gonorrheal vaginitis in infants and children was assumed to be proportionately great. In consequence numerous attempts were made by all persons interested in child welfare to study the question. The American Pediatric Society through its special committee on vaginitis has recently published its report upon a very extensive investigation on the subject.[1] The resolutions embodied in that report contain the most approved recommendations for sanitary and hygienic measures to be adopted both for the prophylaxis and the actual management of the disease. Without a single exception these excellent rules may be profitably adopted in all communities, since they are helpful not only in the matter of vaginitis but also in the general prevention of the infectious diseases of childhood.

In this connection it may be well to mention that these recommendations had been practically anticipated *en masse* during the progress of our work at the Mt. Sinai Hospital Dispensary. With the efficient aid of the two nurses of the Social Service of the hospital, Mrs. Carrie C. Gibson and Miss Helen J. Moses, it was possible to carry out the follow-up system in the vast majority of our cases. Our work was further encouraged and stimulated by Dr. S. S. Goldwater, Director of Mount Sinai Hospital. His interest in the problem was all the keener since it became a matter of municipal importance to the Health Department. In one of his publications on the subject[2] he stated that "a form of vaginitis, which is bacteriologically indistinguishable from gonorrheal vaginitis, is a common condition among children in this city and elsewhere, and that this is well known to clinicians." Further, "that as far as he was aware the problem had not as yet been solved anywhere," and as Commissioner of Health, "can only promise on behalf of the Department, unremitting attention to it, in the hope that a working program may ultimately be formulated." Still further, to quote the Health Commissioner, "as the condition in question is one which, notwithstanding the most intensive treatment, often persists for months and even years, it would be necessary to inaugurate a method whereby the education of excluded children could be continued. The only logical method would be to send private teachers into homes of infected children."

The importance to the municipality from a social, economic, and educational standpoint can, therefore, scarcely be exaggerated if it can actually be established that vaginal discharge in children of school age and under is gonorrheal. The general consensus of medical opinion, according to Trist and Kolmer,[3] favors the gonococcus origin of the vast majority of cases of vulvo-vaginitis in children. Upon this assumption are based all rules for prevention, control and cure of the disease as applying to homes, hospitals and communities. Most observers have accepted this opinion as an established and indisputable fact, and upon that premise have also conducted their medical treatment. My observation of this class of cases during the past six years has led me to a conclusion contrary to that which is generally held concerning the nature of this affection in children.

The purpose of the present paper is to detail my experiences with vaginitis in children studied and treated in a special class at the Mt. Sinai Hospital Dispensary for a period of four and a half years. In this special class, which was established in June, 1912, we had an opportunity to study the clinical manifestations and varieties of vaginitis in infants and children. I shall not enter into the details of the institutional administration or the technic of the treatment of the children in this dispensary class, but rather I shall call attention to certain phases of the problem which are of fundamental importance. Two points will receive special attention, since upon their solution depend all the rest:

1—*The incidence and prevalence of gonorrheal vaginitis in children.*

2—*The value of smear examinations in the diagnosis of gonorrheal vaginitis in children.*

Since the class for vaginitis in children was established, altogether 255 cases have been observed. Of this number, 50 were treated by Dr. Barnett during the first year. His conclusions were published in September, 1913.[4] In his paper, and in fact in all recent publications on vulvo-vaginitis in children, the gonorrheal nature of the disease has been taken more or less for granted. I was under the same impression when I undertook an investigation into the cause of the persistence of gonorrheal vulvovaginitis in children.[5]

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* The present paper was originally submitted as a brief report on the progress of this work to Dr. S. S. Goldwater, Health Commissioner, New York City, 1914-1915, and Director of Mount Sinai Hospital.

By means of the electric lighted speculum we were able to study the appearance of the vaginal portion of the cervix uteri, the entire vagina, and also to note the distribution and amount of the discharge. In all these cases we had supposed the diagnosis of gonorrhea to be definitely established.

When I took up the work at the clinic I found that the diagnosis of gonorrhea was made by smear examination. Upon a positive report for "G." in any given case with some vaginal discharge, the little patient was at once subjected to treatment which was deemed most satisfactory in our experience. When, however, smear examinations for gonococcus proved positive in a number of apparently normal children who exhibited the slightest vaginal secretion, it became obvious that some other method than smear examination was necessary to establish the presence of gonorrheal infection. In the absence of special cultural methods for differential diagnosis or more elaborate bacteriological facilities, I was obliged to guide the treatment of these cases of so-called gonorrheal vaginitis in children according to the reports of frequent smear examinations. As the vast majority of the little patients attended the clinic regularly I was able to compare the progress and character of the vaginal discharge with the bacteriological report of the slide examination. In one case more than 50 smear examinations were made. This case alone would suffice, if no others were available, to show how little dependence can be attached even to Gram-staining of the smears. This case will be referred to again.

Of the 255 cases to date, I have taken the first 100 consecutive cases for analysis. The anamnesic data were both scanty and defective. It was soon seen that they could not be grouped or utilized for statistical purposes. My chief object in collecting the data, scattered as they may seem, was to determine, if possible: 1. The prevalence of gonorrhea among little children. 2. The meaning of vaginal discharge as such. 3. The diagnostic value of smear examination. 4. The relation between treatment, discharge, and a positive or negative report of gonorrhea. 5. What is essential in the establishment of a positive diagnosis. 6. Contagiousness.

The majority of the patients were referred to the vaginitis class by the chiefs of the children's clinics in the dispensary. Only a few were brought by parents directly to the vaginitis class. It is remarkable that in four years only 255 cases were treated in the special class. During these four years approximately 50,000 children were seen in the children's classes at the dispensary. The percentage of children referred by the physicians and nurses to the vaginitis class for the treatment of the "V. D." (venereal disease) was 1 in 200 cases. This percentage seems small in comparison with the incidence of this condition as estimated by other writers. On inquiry I learned that the "V. D." is not especially sought for during the physical examination but usually the mother calls attention to it, whereupon smears are taken. The parents, however, attach no special importance to the discharge unless it is profuse, and avoid having the children treated because of their fear of injury to the hymen.

While all cases referred to the vaginitis class were supposed to have had a positive smear examination before they were sent to us for treatment, a few were referred without such preliminary examination. In every instance we sent smears of new cases for examination. It is interesting to note that out of the first 100 consecutive cases, 29 smears were returned negative, 60 smears positive, and 11 were undetermined.

*The cases with positive first smears* on subsequent examinations were *reported negative* for one, two, three or more times consecutively or alternately. The cases with *negative first smears in 5 instances proved positive after one to six months of observation.*

A great many of the positive first smears presented only a slight amount of discharge, in some instances no greater than would be anticipated in the normal female child. A few of the cases with negative first smears showed, however, a rather profuse discharge which would justify the suspicion of gonorrheal infection.

Of the 100 cases only 21 showed abundant discharge. In 7 the discharge was sero-granular; in 5 the discharge was moderately purulent; in 9 the discharge was profusely purulent.*

All the rest of the cases showed for the most part red streaks at the vulva, folliculitis, eczema of vulva, merely moisture or a slight amount of sero-granular discharge without inflammatory changes evident in the vagina. In a number of instances there was a similar secretion within the vagina without, however, acute changes or evidences of chronic changes in the vaginal mucosa. Where there was purulent discharge it was also found abundantly within the vagina, and in a few instances the mucosa was angry looking and swollen and bled easily. The majority of these cases had never before been treated for the vaginal discharge. This fact must always be taken into account because treatments of various kinds undoubtedly induce certain changes in themselves. These changes are either of traumatic origin or are due to secondary infections. The cases which formed the basis of our previous study had all been subjected to prolonged treatment before we examined them.

The reports of smear examinations was out of all logical relation to the clinical status of the case, the amount of discharge, the duration of the discharge, and especially, to subsequent examination. We found, too, that *frequently without* any treatment a second report was returned negative, a third positive, and then irregularly positive and negative; while, after active treatment, a negative case would be reported positive, and then irregularly positive or negative.

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* Purulent in the clinical sense. In our reports it was not stated whether pus cells were abundant or not.

I have attempted to tabulate the cases with reference to the relation between the laboratory reports of smear examination, the amount and character of the discharge and the different methods of treatment. Altogether there were six hundred and twenty smear examinations. The results are at such great variance in regard to the character, amount and duration of the discharge, that it is hardly worth while to present them all in detail. I will content myself with giving the history of Case 1.

S. J., age 10; for the past four years she noticed vaginal discharge. Prior to this she had some exanthematous disease for which she was treated at Willard Parker Hospital. She dates the onset of the discharge from that time. Patient was referred from one of the pediatric clinics at the Mount Sinai Hospital Dispensary, on April 3, 1912. There was then a slight amount of secretion which was positive for gonococcus. Endoscopy showed the vaginal mucosa bathed by thin sero-granular secretion; there were no acute inflammatory changes. Treatment was begun by Dr. Barnett, who put her on urotropin internally and argyrol 10% locally. He tried in succession silver nitrate 10%, bichloride of mercury 1-10,000 to 1-4000, then tincture of iodine and lugol solution for irrigations, and finally tr. iodine applied locally to the vagina. The smear examinations during this time, *i.e.*, a period of 16 months, were positive seventeen times and negative eighteen times. August 19, 1913, I examined the patient and found then a sero-granular discharge. The child in the meantime had developed and seemed normal in other respects. There were no symptoms suggestive of metastatic spread of the disease. September 18, 1913, rectal examination to determine whether there was any peritoneal exudate, tubo-ovarian disease, etc., proved negative. There was no thickening of the adnexa; no masses were palpable, and the uterus was small and freely movable without eliciting tenderness or pain. Smears were negative on 4 occasions in the period between September 28, 1913, and October 31, 1913. The discharge was considerably less; 10% silver nitrate applications were used. December 1, 1913, she was without discharge and was therefore not treated but observed till January 19, 1914, when she again appeared with a slight amount of secretion. This was negative for gonococcus. She was then treated by protargol 25% topically, and again by painting the cervix and vagina with tr. iodine. As the amount of discharge was almost negligible I decided to let her stay away for a longer period. She returned two months later with the local condition the same as when last seen. Thereafter, for a period of 15 months, although the character of the discharge was the same and no manner of treatment employed, the vaginal smears continued to be irregularly positive and negative. The number of negative reports would preponderate in the proportion of 3 and 4 to 1. The child is now 14 years old, has had her menses nearly a year. She has had no disturbance to speak of during her periods and appears to be well developed in every way. The smear examinations are still positive and negative. Altogether there were over 50 slide examinations.

Summary: A child 6 years old is ill with one of the exanthemata, for which she is treated at a special quarantine hospital. She leaves the hospital with vaginal discharge. This is untreated for four years, at the end of which time treatment is begun by various methods for four years. Puberty sets in meanwhile and the girl develops normally. The discharge becomes negligible, but slide examinations are variously positive and negative, no matter whether she is treated or not treated.

While many of the other children were not observed for a similar length of time, their history would fit in precisely with any given period of time under which this patient was observed. It must be said in this connection that smears were taken from the very depth of the vagina through the aid of the endoscope devised for this purpose, and that even the vaginal portion of the cervix was accessible in every case.

It soon became evident that if we were to rely solely upon the report of the *smear examination we could make no headway with any kind of treatment*. When the discharge disappeared under whatever procedure we adopted, and the patient's condition could be regarded as perfectly satisfactory, the report, nevertheless, would be returned positive or negative. When the child appeared for control examination from one month to two years or more after further treatment was considered unnecessary, the same experience with the smear examination was encountered.*

The relation between active treatment, the smear report and the character and amount of the discharge was very interesting. At first I used strong solutions of silver, as recommended by Kelly. After each application there followed a very profuse discharge of mucus. The smear reports from this discharge were often positive and occasionally negative. The silver solutions were then used in weaker dilutions, and by and by the discharge became less and less and almost absent.

*A similar reaction took place in cases with very scanty discharge*—cases which appeared simple and of the non-infective type of vaginitis. As time went on I began using weaker solutions and used argyrol, which had the advantage of being practically painless and of being more oily and hence easier of application. The amount of reaction was considerably less. Later on I adopted the plan of infrequent applications, and for control purposes, in those instances where I felt clinically certain of their non-gonorrheal character, I simply observed them, took smears from time to time but did not apply medication. The latter group of cases did better as far as discharge is concerned; *the smear reports were just as confusing as in other cases.*

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* Barnett came to the conclusion that three consecutive smears could determine a cure, but added that the children were to return for further control.

### DISCUSSION OF THE PROBLEM.

The contradiction between the smear report and the clinical status of the case may be discussed from two viewpoints: first, that the gonococcus, if responsible for vaginitis in children, has markedly variable activities, often lying dormant, capable of being stirred to activity by certain medication, or more often, perhaps, by virtue of its own peculiar biologic properties, which are not exhibited by the adult form; and second, that the organism reported by the smear is some other organism than gonococcus, almost indistinguishable from it but present in the vaginal discharge without having the pathogenic significance of the gonococcus. If the first viewpoint were correct, then practically all of the 255 cases must be regarded as gonorrheal; and if we consider that a great many cases go unobserved or are untreated, the prevalence of this disease might be regarded as truly formidable. If young girls who commonly have vaginal discharge were subjected to smear examinations and a similar organism found, the incidence of innocent gonorrhea would be almost universal. No one, however, thinks of charging young girls of the age of puberty with gonorrheal infection because they happen to have some discharge. Vaginal discharge is a very common thing, and is only natural because a certain amount of secretion is physiological and normal for all mucous membranes. The onset of menses, etc., naturally accounts for a greater secretory activity of the genitalia in young girls. *In children and in infants there are other factors that enter into play.*

Inquiry into such factors in the 100 children in whose cases a definite history was obtainable elicited the fact that *32 had been in hospitals suffering for the most part with an exanthematous disease;* in other instances they had pneumonia, typhoid, dysentery, appendicitis, chorea, etc. In 15 instances there was a definite statement that the child had not been confined in any hospital, but there is no record of whether these children were ill at home just prior to the onset of the vaginal discharge. It is not necessary to think of a direct gonorrheal inoculation, as for example, by means of thermometers or careless handling by nurses infected with the venereal trouble, etc. The exanthematous disease may properly be assumed to cause a certain amount of desquamation of the vaginal mucosa; secondary invading microörganisms propagate more in the discharge. The micrococcus catarrhalis, morphologically often indistinguishable from the gonococcus in the simple smear examination, is one of these organisms. In the other diseases with pneumococcus, the meningococcus, the streptococcus and the other pathogenic bacteria present in the body these microörganisms may set up a vaginitis with purulent discharge similar to that seen in cases of acute suppurative otitis.

Vaginal discharge in infants and small children may have the same pathogenesis, and in my opinion is far more commonly due to these bacteria than to the gonococcus.

Apart from these considerations, careful observation of small infants has shown repeatedly that the fecal motion bathes and soils the vulva and the clitoris and leaves excreta in the labiocutaneous and interlabial grooves, and at the vestibulum. Urine also leaves its residue. If the child is not frequently and carefully cleaned after each soiling there is the nidus for more bacteria, and in many instances the vagina is invaded.[*] During the act of crying, coughing, rapid and labored breathing and straining, particularly during acute illness, the hymenal orifice opens and closes, and not infrequently débris such as above mentioned is aspirated into the vaginal canal. *The colon bacillus and other rectal flora under the new influence of even normal vaginal secretions may be assumed to take on an irritative activity and set up a vaginal discharge.* When one reflects how often and for how long infants and even small children are obliged to lie in their crib before receiving necessary attention in the large wards of hospitals, owing, of course, to inadequate nursing facilities, it will be seen that this spontaneous method of infection is not so remote a possibility.

In favor of this idea is the comparative scarcity of vaginitis in children ill with an exanthemata but who are treated at home.[†] The presence of pus in the vagina, even though it be in that of infants, irresistibly suggests a venereal origin. In this connection I may mention the one case in our series which had for a long time been treated by vaccine in another clinic for gonorrheal vaginitis. This little girl had suffered from a very profuse and very obstinate discharge which cleared up promptly on the removal of an incrusted hair-pin from the vagina.[6]

A small number of children date their discharge from birth. This does not necessarily mean gonorrheal infection. I have examined a number of female fetuses 4 months old and over and found a whitish discharge from the vagina in a number of them. *Treatment in innocent cases may serve to plant bacteria where they did not exist before and to start a chronic discharge.* To obviate such contamination, in simple cases which clinically make the impression of a non-gonorrheal vaginitis, I have massaged the vagina through the rectum, succeeding in this way in bringing out any vaginal secretion that may be present; this could then be examined microscopically.

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[*] Dr. Martha Wolstein of the Rockefeller Institute, who kindly examined some smears for control purposes, reported that she found fecal material microscopically, though the swab was carefully applied through the endoscope to the depth of the vagina, in every case in which smear was made.

[†] Where there may have been arthritic symptoms but where the gonorrheal character was not definitely established by x-ray, at least, or by actual recovery of the gonococcus from the joint, the diagnosis may be left in doubt.

## SUMMARY AND CONCLUSIONS.

Of all the cases seen, I should say, from the clinical side, that the very smallest number were truly gonorrheal, resembling the disease as met with in the adult. A definite history of contact infection, as by perverts (the infectionist theory of Pollock) or through attempts of rape, was obtained in only one case. In two others there was definitely the evidence of a ruptured hymen without such a history of assault. In the vast majority of cases the complications and sequelae of gonorrhea were entirely lacking. The absence of gonorrheal ophthalmia, of urethritis, of joint symptoms and of *peritoneal symptoms*, in spite of the apparent chronicity of the discharge, certainly makes one reflect that this condition in children is at least different from the gonorrhea of adults. It certainly does not have the virulence nor the tendency to cause metastatic foci as it does in the adult. In this connection Louise Pearce's[7] work on the comparison of adult and infant types of gonococci is both suggestive and significant. She found in working with strains of gonococci from adults and strains from children that, both in agglutination and complement-fixation experiments, these strains differed so uniformly that they could be distinguished as two distinct types corresponding to the clinical source of the strains. Her experimental material was derived from 6 cases of vaginitis in children, 3 cases of gonorrheal ophthalmia (*a*) neonatorum; (*b*) girl 18 years with vaginitis; and (*c*) boy 15 years with urethritis; and finally 8 cases of gonorrhea in adults.

*It is of the greatest significance to note that the strains of gonococci isolated from the three cases of ophthalmia are classed by Pearce with the adult type.* In the cases observed by me there was not a single instance of ophthalmia.

If the disease were really as prevalent as we have been led to suppose,* we ought to see more dangerous sequelae later on in life. We ought to see more pyosalpinx and pelvic peritonitis in young girls. We know, however, that practically in every instance where such condition obtains in a young girl of 14 years and upward there is always a definite history of recent exposure, with all other signs and symptoms of a gonorrheal infection.

*That a true gonorrheal infection does occur in children* · cannot be denied; there have been enough reports where the gonococcus of Neisser was recovered from metastatic foci in the body joints,† eyes, etc., associating a gonorrheal vaginitis. The actual incidence of the latter in children is probably very small. My clinical experience coincides with that of V. Pirquet and V. Reuss, for example, who stated that they see in their very large clinical material only 5 or 6 cases yearly. *If the majority of children having vaginal discharge are infected with the gonococcus, it must in all probability be a different microörganism from that described by Neisser as occurring in adults.* Whether it is some other organism, however, can be established only by proper *bacteriological and serological tests.* Thus the well-recognized infectious vaginal catarrh which spreads through hospital wards may have some other bacteriological etiology than the gonococcus. Some other method of diagnostic control than that offered by smear examination must be available if we are to treat it intelligently and scientifically. I have found not only the greatest discrepancy between the clinical picture and the smear report, but in a series where two different bacteriologists made the examination there was the greatest contradiction in their reports on the same material examined. The bacteriologists were of unquestionable reputation, with the best facilities for bacteriological examination. While this difference of opinion is possible in any other laboratory test, in this work it adds considerably to the other difficulties in coping with the vaginitis problem.

From my experience with these cases I am led to the following conclusion:

To establish the diagnosis of *gonorrheal vaginitis* in children and infants, it is necessary to have: 1, A purulent discharge from the vagina. 2, The intracellular Gram-negative diplococcus of Neisser must be discovered in the pus cells (smears and cultures are facilitated by the endoscope). 3, This organism must further be grown on suitable culture media and properly identified as the gonococcus. 4, In case of doubt, complement-fixation tests and agglutination tests should also be resorted to. In the absence of these tests we are not justified in considering any vaginal discharge in children as gonorrheal, nor are we justified in treating it as such. *The smear examination, even by the Gram stain of secretion or discharge from the vagina, is unreliable and misleading, and hence valueless as a method of diagnosis.* The desideratum in the problem of vaginitis among children, therefore, is more complete and scientific bacteriological study, including animal inoculation.

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* P. C. Jeans, quoted by Taussig, found, out of a total of 262 girls over one year old coming to all branches of the dispensary of the Children's Hospital in a period of five months, 14, or 5.3%, were infected with gonorrheal vaginitis.

† Of Holt's 26 cases of gonorrheal arthritis in children, 19 were in males and 7 in females. Of the females only four had vaginitis, although 273 cases of vaginitis were observed.

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# THE PRIMARY LESION OF TUBERCULOSIS; ITS SIGNIFICANCE, DIAGNOSIS AND TREATMENT.*

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IN a lecture on tuberculosis to a group of American medical men in Vienna, I heard Prof. Hamburger state at the outset of his lecture that in order to understand adult tuberculosis one must study the tuberculosis of infancy. What he meant was that to understand the whole picture of tuberculosis it is necessary to grasp the meaning of primary tuberculosis; that tuberculosis is a disease similar to syphilis in that they are diseases with a primary lesion and primary stage whose symptoms and pathology are different from the later manifestations of the disease.

What was formerly known as the chronic glandular tuberculosis of infancy or what was meant when it was said that a baby might be infected with tuberculosis but not have the disease is now recognized as the primary stage of tuberculosis. It usually occurs in infancy or early life, but I believe that an individual, no matter what his age, must first have the primary lesion to be followed by later destructive types of the disease; and I feel sure that this is the teaching of recent investigators in tuberculosis. The primary lesion may lie dormant many years, when, under conditions suited for its breaking down it will spread and give rise to the pathological changes which have been taught as active tuberculosis or tuberculous disease. To say that a baby is infected but does not have a disease just because we may never have recognized the symptoms, is not tenable with modern pathology, especially as there remains true pathological tissue after infection. I agree that it does not give signs and symptoms recognizable as those of tuberculosis, but it does give symptoms of its own, and its importance is far more reaching in that it is the potential of the most serious malady of the human race. Granting its importance, I wish to bring to your consideration the primary lesion of tuberculosis, its significance, diagnosis, and treatment.

In order to illustrate to you what constitutes a primary lesion and how it is formed, I will describe an experiment shown me by Prof. Hamburger and which you may find more fully described in his work, "Die Tuberculose des Kindesalters." If a tuberculosis-free guinea-pig be scratched on one shoulder and inoculated in the scratch with a pure culture of tubercle bacilli, a primary lesion will be started. The scratch with this small dose will show no change macroscopically for a week, when an infiltration will appear about the scratch. At the same time the axillary glands draining the region enlarge and ultimately form a mass of large discrete glands. Here is a primary lesion, the portal of entry, and the extension through the lymphatics to glands draining the region of the portal of entry. This represents what takes place no matter where the infection first enters; there is the primary focus and the enlargement of the adjacent glands. If the first infection is in the adenoids then there are post-cervical glands; if in the tonsil, anterior cervical glands; if in the lung, bronchial glands; if in the intestine, then mesenteric glands; and anywhere in a cut of the skin the glands draining the region will enlarge. The portal of entry in the human is usually not found except in the lung, where it is represented by a grayish area the size of a mustard seed or pea; but I feel sure that if it were possible to search minutely enough it might be found in other localities. The portal of entry and the mass of glands constitute the primary lesion. It is impossible to have the one without the other, consequently, they go together to make up the primary lesion. The primary lesion and its symptoms make the primary stage of tuberculosis.

The primary focus may be anywhere that the bacilli happen to locate, but naturally there are some places more accessible than others. The two most common places are the lungs and the intestines. Figures as to the relative proportion of the two regions vary with the locality in which the observer lives. If in a locality where the milk supply is not safeguarded against tuberculosis, there will be a larger proportion of primary intestinal tuberculosis than where the milk supply is from tested cattle; though I must say I think the region of the primary lesion is no criterion, whether the infection is bovine or human; though if intestinal it is presumptive evidence that the bacilli were carried in the food, probably milk. However, the milk must be accidentally infected during or after milking unless there is disease of the udder; for there is no evidence to prove that bacilli can pass through the uninfected udder or breast but that they are introduced from dust and dirt from the cow or from a tuberculous milk handler, and hence they may be human or bovine, but the chances are in favor of bovine. Other entry points are the adenoids, tonsils and skin. The adenoids and tonsils are not so common in infants as in older children. The skin must be broken, and though not relatively so common as the other portals, is not a negligible source, as there are many cases on record where primary infection occurred during the rite of circumcision.

By far the greater proportion of the infections are in the lungs, and each case of primary bronchial glands tuberculosis indicates a close relationship with an open case of tuberculosis.

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* Read before the Medical Association of Central New York, in Auburn, New York, on October 18, 1917.

We were formerly taught that it took a long exposure to a tuberculous individual to acquire tuberculosis. One breath or one drink of milk is sufficient. We now know that it does not take a long time to infect, and the older thought applies to the appearance of secondary tuberculosis due to continued exposure or to the breaking down of the primary lesion. The relationship must be close enough to get the sputum laden with bacilli directly by kissing, or by breathing in droplets of infected sputum thrown out by coughing, talking or sneezing; by inhalation of dust infected by such sputum; or by taking in infected food. This fact alone will explain why so many are infected in infancy and early childhood, for it is at this age that such relationship is established. They are handled and they creep about in the dust. Hence what was supposed to be a type of tuberculosis characteristic of infancy is merely the primary lesion acquired at the time when all the conditions are right.

If, as I say, the primary lesion is potential of trouble, it seems to presuppose that it is harmless and symptomless. Not at all so, for I am sure that in infancy, though it does not give symptoms ordinarily recognized as those of tuberculosis, it may give general symptoms of anemia, fever, indigestion with its resulting malnutrition and failure to gain, and I feel reasonably sure that it also gives such symptoms in older children. The symptoms are due to absorption of toxic products formed by the primary lesion and are consequently of a general character and not localizing. Such disturbance of the general health may be overcome and no permanent disability result; it is a part of the primary stage without any further demonstrable pathology in life than of the primary lesion. However, if these symptoms are not relieved by proper treatment, the tissues lose their resistance, the primary glands break down and the disease is spread.

Now to illustrate what may take place in an individual with a primary tuberculosis a second experiment on our already infected guinea-pig is of interest. Repeat the experiment on the other shoulder with a similar small dose of bacilli. The scratch will heal and later small glands appear in the axilla. Nothing more happens if the individual is in good conditon or if the dose is not large. In other words, there is a certain amount of immunity to repeated small doses. There is some experimental evidence in animals to show that tissues differ in their resistance and consequently the number of bacilli necessary to set up secondary processes varies. This or other reasons make it possible for fewer organisms to set up secondary lesions in the lung than in the intestine. The point I wish to make is that there is a slight immunity which, if broken down, gives a chance of exacerbation in and spread from the primary lesion or for reinfection to start inflammatory processes. This immunity seems to be far less in the infant than later in life.

If this lowering of the resistance and spread from the primary lesion may be called the endogenous cause of spread there is an exogenous one in that other infections draining into the same glands cause secondary breaking down and spread of bacilli which have been hiding there and which hide there throughout life ready to be spread. Hence the disastrous results after measles, pertussis, pneumonia, and bronchitis where there are preëxistent primary bronchial glands; or after diarrheas where there existed primary mesenteric glands.

Now to compare the primary and secondary lesions: The primary focus may remain apparently arrested; the secondary ulcerates; the primary glands are large and discrete; the secondary small, though there may be quite a mass of them. Hence tuberculous ulceration of the bowel, usually multiple, with small mesenteric glands, is secondary; tuberculous bronchopneumonia with small glands is secondary; a single intestinal ulcer with large glands is primary. To go further into secondary tuberculosis would lead us away from our subject, but let me say that secondary tuberculosis in infancy shows very little or no tendency to heal, whatever it may do in adults.

You may easily see that a baby whose tissues are sensitized by a primary lesion is in a highly precarious state to keep in a tuberculous surrounding, for breathing in or swallowing bacilli may set up a secondary process if his general condition is poor. This is a considerable danger, but curiously the spread of the disease almost always comes from the primary glands and the primary focus, if it remain, which break down on account of the lowered general resistance; or a new non-tuberculous infection into the same region starts up inflammation which softens the primary glands, and hence, from either cause or both together the softened glands dump bacilli into the surrounding tissues or into the blood or lymph. The spread may be to the tissues about the primary glands or primary focus, thus giving rise to the destructive hilus tuberculosis seen in infancy, to pneumonia about the primary focus, or to the peritonitis seen with tabes mesentericus. This has been called extension by contiguity. The primary glands may break down, ulcerate into a blood vessel, lymphatic, or into a bronchus. If the break is into a blood vessel the spread will give miliary tuberculosis of the various organs including the meninges; if into the lymphatics, spread to other glands; if into a bronchus, then by aspiration of the sputum into the smaller tubes, bronchopneumonia; by coughing, the sputum laden with bacilli may find lodging in the tonsil causing secondary cervical glands, and such sputum swallowed may give secondary ulceration of the intestine. Thus the spread is in one of four ways to the surrounding parts, by the blood, lymph, or sputum.

Now, in the diagnosis, if you bear in mind the characteristics of the primary lesion, that it is composed of a primary focus which is never found except in the lung and then only at autopsy, and of a mass of large discrete glands, then you may see that your diagnosis must rest upon finding such a mass of glands and that in primary tuberculosis you are not going to find any signs such as we have always been taught to look for as tuberculous, which are all secondary; consequently, the signs must vary with the locality involved. If the glands are situated in the neck they can be seen and palpated; if in the abdomen they may be palpated and are usually found in the right iliac fossa. In the chest, however, the glands are detected by signs and other methods which I will describe at greater length.

The history is significant only when there is evidence of direct exposure, but lack of such history means nothing. There is as much tuberculosis in children of non-tuberculous families, or rather negative family history, as where there is a definite history. This fact shows that it is easy to infect infants, that the chances for infection are too many, and that only a short chance exposure is necessary.

Primary tuberculosis may apparently run a symptomless course and be discovered only when doing a series of tuberculin tests or when trying to find the number infected in a family where there is an open case of tuberculosis. It seems to be true that the younger the individual when infected the greater the probability of symptoms from the primary lesion, and that the older children are the ones to run a course without symptoms. On the other hand, as the symptoms are due to absorption of toxins from the primary lesion it seems to me impossible to state that any case may not have had slight fever, indigestion or fail to gain properly at some time due to his primary tuberculosis, and such symptomless cases will be fewer the more diligently we search for primary tuberculosis. It seems to me far better to consider all tuberculosis either inactive or active rather than say that a baby may be infected but not have the disease of tuberculosis. Here lies the significance of the primary lesion; it is a disease process that may at any time light up.

The symptoms are of little help in the diagnosis for they do not attract the attention to the region involved. They are general in character, as slight fever, anemia, malnutrition, peevishness, indigestion, usually showing marked fat intolerance. Cough is an occasional symptom of primary bronchial glands, but I have a feeling that if there is the brassy cough and evidence of bronchial glands, that the process is already more than a primary one and that there is extension or that the glands are very large and caseous and in danger of spread.

I have said that in certain localities the glands may be palpated, but bear in mind that you are to feel a mass of large glands, not a large mass of small glands; for you may have secondary intestinal ulceration with numerous small mesenteric glands which together form a large mass, while the primary lesion is in the bronchial glands. On the other hand, if the mesenteric glands are large, hard, discrete, you would have a right to conclude that there is a primary intestinal lesion with primary mesenteric glands even though there are signs of enlarged bronchial glands which, under those circumstances, may be due to a recent bronchopneumonia of non-tuberculous origin.

In the chest the glands cannot be palpated and we must resort to percussion, auscultation and x-ray. I think by far the most reliable information is gained by careful percussion, but every little detail in the technic must be observed. When percussing the chest for glands I prefer that the infant lie on a smooth, hard surface rather than have it held on the lap. I am speaking of primary tuberculosis so I leave out consideration of the examination of the lungs, for there will be nothing found there as the primary focus is too small to give signs. The infant should lie with the spine straight and when examining the back the arms should be held out at right angles to get the scapulae out of the way, thus baring the interscapular spaces. The percussion on the two sides must be symmetrical with relation to the sternum in front and to the vertebrae behind. When percussing for spinal dulness, that is dulness in the median line in the back, compare percussion over the spinous processes or over the spaces, not a process and a space, for the process will be duller than the space anyway. In front there will be dulness over the third space to the right of the sternum; the left side is masked by the normal dulness due to the great vessels and cannot be determined. This dulness in front is not to be confused with thymus dulness as there is no dulness high by the side of the sternum. In the back a spinal dulness below the third dorsal vertebra is suspicious, and if accompanied by dulness between the vertebrae and the scapula, that is interscapular dulness, is diagnostic of thickening at the root of the lung on that side. I think a moderately low spinal dulness may exist without interscapular dulness and is then of no importance. Interscapular dulness cannot exist without low spinal dulness and the two together are of the greatest importance. I think a diagnosis of bronchial glands is not justified unless there is interscapular dulness. There is slight dulness in the left interscapular space normally, consequently if both sides are of equal intensity there is a pathological dulness on the right. The left side must be distinctly dull to warrant a diagnosis of left-sided infiltration. Naturally, from what I have said of the primary lesion, the side in which the interscapular dulness is located points to the side of the primary focus.

By auscultation one tries to get the D'Espine sign, by which is meant the point on the spine going from above downward where the whispered voice or expiration changes from bronchial to vesicular in character. The loudness or harshness of the voice or expiration does not show the sign but the bronchial character which may even be quite distant. In infants it is normally at the second dorsal vertebra and may be at the third without any demonstrable lesion at the hilus of the lung. In older children and adults the change takes place at the seventh cervical, but in any case I do not think it suggestive until it is down to the third or lower and then only diagnostic if backed up by low spinal and interscapular dulness.

The x-ray should be used whenever possible to confirm the physical findings. It is only confirmatory, for no one can say from a plate that a baby has tuberculosis. I feel sure that any case that will show on the plate a definite shadow at the lung root outside of the heart border will give to percussion low spinal dulness and interscapular dulness, and I would not be willing to condemn an individual on the x-ray plate alone. The evidence of percussion, auscultation and x-ray must all be used in making the diagnosis of enlarged bronchial glands.

These signs indicate only enlargement of the glands situated along the trachea, at the bifurcation of the trachea, or following the larger bronchi, all commonly designated as bronchial glands, but do not make out the case to be tuberculous. Before a diagnosis of tuberculosis can be made, all other causes of enlargement of the bronchial glands must be ruled out, as recent pneumonia or any acute or chronic process in the lung which will cause enlargement of the glands. However, if the history points to recent acute lung disease, the glands will soon disappear. If there are still signs in the lungs the case cannot be one of simple primary tuberculosis which gives no lung signs. The diagnosis where there are lung signs lies between secondary tuberculosis and something not tuberculosis or some acute process plus primary tuberculosis, and then only time and repeated examination will tell.

The examination of the sputum is of no assistance, as the primary lesion is a closed tuberculosis, and if bacilli are found it means secondary tuberculosis. For the same reason guinea-pig tests are impossible. The various tuberculin tests are of great assistance in determining if an individual is tuberculous, but they are reliable only if positive and then only indicate that there is tuberculosis present, but have no diagnostic value as to where the lesion is or what stage it is in. If the individual has only one mass of large glands and a positive tuberculin test then the chances are that that is the primary lesion. If there are several masses of glands, the test does not point to the primary glands, but you must find them by picking out the oldest and largest glands. A negative test, especially in infancy, means nothing, for there are many chances that the infant is not in the right condition to react and may react at one time and not at another. A baby with definite signs I should consider tuberculous and treat as such in spite of the tuberculin tests. I do not intend to discount the value of the test but all the exact knowledge that it affords is that there is tuberculosis somewhere in the case and that is absolutely reliable, for there cannot be a positive tuberculin test where there is no tuberculosis. It does not indicate the location of the primary lesion nor the stage of the disease and I am still to be convinced that it has any bearing on the prognosis. The tests require too much interpretation to be of clinical value except as indicative of tuberculosis if positive.

Having established the diagnosis of primary tuberculosis or made a probable one, what should be done? It has been taught that such an infant has an infection with tuberculosis but not a disease and consequently there is nothing to be done. If a man has a typhoid, the walking type, would you let him run about eating anything he wanted and doing anything he wanted and take the chance of serious complications? That question is ridiculous but it is equal folly to neglect to look out for a lesion that has the pathology and possibilities of primary tuberculosis. Pathology shows that there is no danger from the primary lesion as it is, hence the treatment must be to keep the disease primary. From what I said about the causes of spread, the treatment must be directed to the maintenance of the general resistance above the point where the tissues can break down, to the prevention of reinfection from tuberculous surroundings, and to the prevention of new infection in the same region drained by the primary glands.

There are three essentials in treating the general symptoms of primary tuberculosis,—fresh air, well-regulated diet, and rest. Fresh air does not mean cold air and indeed it may mean very warm, fresh air; for coldness is not an indication of freshness. Regulation of diet to avoid any sign of indigestion; especially look out for fat indigestion, for infants and children with tuberculosis tolerate fat badly. The natural thing for a mother to do with a child not gaining is to increase the fat. Do not be afraid of low fats. The rest should be sufficient to establish and maintain good general condition and gain in weight even to the point of demanding absolute bed treatment. I have kept young infants flat in bed an entire year before gaining the desired improvement.

As for reinfection from open cases, so long as the infant is in good condition the danger is not great, as there is a certain amount of immunity to small doses. The danger arises when the tissues are non-resistant and a new lot of organisms are breathed in or swallowed and then set up secondary changes. That danger to a poorly nourished child is, I think, considerable. The difficulties encountered in trying to remove such a child from the tuberculous atmosphere are probably insurmountable in most cases, hence the greater need of good care.

The third preventive measure in the spread of the primary lesion—protection from other infectious diseases affecting the same region—is also difficult to carry out. The child with primary cervical glands should be protected from upper respiratory infection and tonsillitis; with primary bronchial glands, from pneumonia, pertussis, measles, etc.; with primary mesenteric glands, from infectious diarrhea. This all means that the parents should understand the dangers in order to help intelligently.

As for drug treatment, there is no specific treatment. I can see no indication for medicine unless for a simple tonic, iron, and cathartics. If the child will not eat and is constipated it is more than likely that he has some indigestion and is overtired. Put him to bed and look out for his fats and I think his appetite will return. Tuberculin treatment is dangerous in infancy for it is too easy to overcome the slight immunity with consequent over-sensitization of the tissues, which then break down and the disease is spread.

Anyone who clings to the old idea that a baby or individual may be infected and not have the disease of tuberculosis must wait till he gets the signs of what he considers to be tuberculosis before beginning treatment. In other words, he is waiting for secondary tuberculosis and has lost his opportunity of arresting the disease within safe limits.

In conclusion let me repeat that the doctrine of the primary lesion must be accepted in order to understand the whole disease of tuberculosis and hence to treat and combat it. It seems to me very dangerous to consider that a baby exposed to tuberculosis is safe, for he will become only infected and not have a disease. The only safe course is not to let him get infected and if, unhappily, he does, recognize that he has a process that may break down and cause serious trouble. If we recognize the importance of the primary lesion and the necessity of keeping it as a primary lesion, then we have the chance to do most for the individual tuberculous subject, and far more than all for the prevention of the spread of tuberculosis among our fellow men, for we have then avoided secondary broken-down processes which throw out living bacilli.

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# LIPOIDS IN 131 DIABETIC BLOODS.

By Horace Gray, M.D., Boston.

**[From the Department of Biological Chemistry, Harvard Medical School.]**

*(Concluded from page 123)*

## BLOOD SUGAR.

Increase of glucose in the blood might be expected to be accompanied by increase of lipoids. Comparing the group averages, this *is* found, first in T.F.A. in plasma, but only after the blood sugar has reached about 0.3%; and second in L. in corpuscles, beginning when the B.S. is slightly over 0.2%.

Comparing the *lowest* lipoid values in the lowest and highest B.S. groups, one finds no significant difference, though a rather higher level in the latter.

TABLE XXV.

RELATION OF BLOOD SUGAR TO BLOOD LIPOIDS.

| Blood Sugar Per Cent. | No. of Bloods | | Blood Lipoids in Per Cent. | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total-Fat | | Total Fatty Acids | | | Lecithin | | | Cholesterol | | | Glycerides | | T. F. A. / L. | | | L. / C. | | | Total Lipoids |
| | | | W. B. | Pl. | W. B. | Pl. | Cps. | W. B. | Pl. | Cps. | W. B. | Pl. | Cps. | Pl. | Cps. | W. B. | Pl. | Cps. | W. B. | Pl. | Cps. | Pl. |
| .08—.11 | 19 | | 0.93 | 1.00 | 0.59 | 0.69 | 0.45 | 0.34 | 0.29 | 0.39 | 0.29 | 0.34 | 0.21 | 0.37 | 0.17 | 1.67 | 2.47 | 1.03 | 1.19 | 0.90 | 1.98 | 1.14 |
| .12—.16 | 19 | | 1.10 | 1.34 | 0.79 | 0.98 | 0.48 | 0.35 | 0.32 | 0.39 | 0.31 | 0.36 | 0.21 | 0.65 | 0.23 | 2.16 | 3.11 | 1.30 | 1.24 | 0.97 | 1.96 | 1.49 |
| .17—.21 | 17 | | 1.17 | 1.36 | 0.85 | 0.97 | 0.52 | 0.34 | 0.32 | 0.38 | 0.33 | 0.38 | 0.24 | 0.63 | 0.33 | 2.25 | 2.96 | 1.30 | 1.18 | 0.91 | 1.60 | 1.48 |
| .22—.26 | 22 | | 0.96 | 1.14 | 0.67 | 0.78 | 0.41 | 0.35 | 0.31 | 0.41 | 0.35 | 0.36 | 0.21 | 0.44 | 0.14 | 1.72 | 2.54 | 1.04 | 1.25 | 0.90 | 2.10 | 1.25 |
| .27—.31 | 20 | | 1.19 | 1.42 | 0.86 | 1.03 | 0.58 | 0.37 | 0.33 | 0.42 | 0.33 | 0.39 | 0.23 | 0.68 | 0.30 | 2.21 | 1.94 | 1.38 | 1.21 | 0.93 | 1.89 | 1.48 |
| .32+ (max. .45) | 11 | | 0.96 | 1.13 | 0.65 | 1.77 | 0.53 | 0.36 | 0.32 | 0.42 | 0.31 | 0.36 | 0.20 | 0.42 | 0.28 | 1.86 | 2.55 | 1.44 | 1.26 | 0.92 | 2.15 | 1.27 |
| .08—11 | | Lowest Lipoids | 0.62 | 0.63 | 0.37 | 0.48 | 0.25 | 0.25 | 0.16 | 0.28 | 0.16 | 0.14 | 0.16 | 0.18 | 0.06 | 1.19 | 1.67 | 0.24 | 0.86 | 0.68 | 1.10 | 0.70 |
| .32+ over | | Lowest Lipoids | 0.61 | 0.66 | 0.40 | 0.46 | 0.31 | 0.27 | 0.18 | 0.21 | 0.18 | 0.15 | 0.17 | 0.22 | 0.04 | 1.21 | 1.83 | 0.69 | 0.84 | 0.70 | 1.23 | 0.74 |
| .08—.11 | | Highest Lipoids | 1.59 | 1.64 | 1.12 | 1.09 | 0.72 | 0.45 | 0.45 | 0.51 | 0.49 | 0.65 | 0.40 | 0.71 | 0.42 | 2.11 | 3.11 | 1.56 | 1.75 | 1.18 | 3.00 | 1.82 |
| .32+ over | | Highest Lipoids | 1.53 | 2.08 | 0.85 | 1.17 | 0.70 | 0.57 | 0.64 | 0.56 | 0.68 | 0.91 | 0.33 | 0.50 | 0.55 | 2.78 | 3.72 | 2.95 | 1.78 | 1.20 | 3.29 | 2.29 |

Comparing the *highest* lipoid values for the same extreme B. S. groups, one finds the expected higher lipoid level with the highest B.S., and by a slightly greater difference than in the last paragraph.

### CORPUSCLE PER CENT. OF BLOOD.

The normal has been stated as 43 for men[1]; for women also as 43%.[2]

Miller, Keith and Rowntree conclude that "all but one were below the normal of 43%, the average being 35.8% in 12 cases before labor." That this "normal" value may be a trifle high is suggested by an average made from their table of 25 observations, giving 38%; also by an average of 38% made from the seven normal women in the series of 21 normal persons whose lipoid averages have been cited.[7] In the latter series the average for the two sexes together is approximately 41%.

The diabetic average for this series is 39%. The diabetic range is 24%-53% vs. 33%-49% in Keith's table of normals. See Table XXVI, which omits such bloods as were clotted, had stood, had no per cent. recorded, or had no total-fat done. The extreme percentages are not consistently paralleled by the lipoids, but these tend to increase when the corpuscle per cent. is abnormal, whether high or low. In other words, the total-fat average for each per cent. does not obviously rise in proportion to the variation± of the per cent. from normal. If, however, a broad normal group is made to include a 10%± variation from 41%, *i.e.*, 4 points±, and then the total-fat values for that group are averaged, the lipoid rise becomes obvious; about 60% increase, when corpuscles run either high or low.

Table XXVI.

Relation of Corpuscle Percentage to Lipoids.

| Corpuscles % | No. of specimens | Av. total-fat in W. B. | No. of specimens | Av. total-fat in W. B. |
|---|---|---|---|---|
| 24 | 1 | 2.59 | | |
| 25 | 0 | 0 | | |
| 26 | 0 | 0 | | |
| 27 | 0 | 0 | | |
| 28 | 0 | 0 | | |
| 29 | 1 | 2.94 | | |
| 30 | 2 | 1.29 | Low corps. % | |
| 31 | 1 | 0.81 | | |
| 32 | 7 | 2.50 | | |
| 33 | 3 | 2.06 | | |
| 34 | 3 | 1.16 | | |
| 35 | 6 | 1.05 | | |
| 36 | 7 | 0.98 | 31 | 1.59 |
| 37 | 5 | 1.32 | | |
| 38 | 9 | 0.99 | | |
| 39 | 10 | 1.28 | | |
| 40 | 14 | 1.02 | Av. corps. % | |
| 41 | 7 | 0.83 | | |
| 42 | 12 | 0.95 | | |
| 43 | 8 | 0.89 | | |
| 44 | 5 | 0.93 | | |
| 45 | 1 | 0.72 | 71 | 1.02 |
| 46 | 2 | 5.11 | | |
| 47 | 1 | 0.78 | | |
| 48 | 2 | 1.16 | | |
| 49 | 5 | 2.28 | High corps. % | |
| 50 | 0 | 0 | | |
| 51 | 0 | 0 | | |
| 52 | 1 | 1.89 | | |
| 53 | 1 | 1.09 | 12 | 1.74 |

Table XXVII.

Relation of Lactescence to Hyperlipemia.

| | Plasma Density | No. of specimens | Total-fat in W.B., Av. | No. of spec. | Total-fat in W.B., Av. | No. of spec. becoming cloudy after 24 hrs. | | Total-fat, Av. |
|---|---|---|---|---|---|---|---|---|
| 1 | Clear | 80 | 0.94 | | | 6 | | |
| 2 | Opalescent,<br>Almost clear | 2 | 1.90 | | | 0 | | |
| 3 | Very faintly cloudy | 4 | 1.41 | | | 1 | | |
| 4 | Faintly cloudy,<br>Slightly cloudy | 14 | 0.96 | I | | 2 | | |
| 5 | Somewhat cloudy | 2 | 1.14 | | | 0 | | |
| 6 | Cloudy | 9 | 1.15 | | | 2 | | |
| 7 | Very cloudy,<br>Muddy | 3 | 1.00 | 114 | 1.00 | 0 | 11 | 0.88 |
| 8 | Somewhat milky | 4 | 2.71 | | | 0 | | |
| 9 | Quite milky,<br>Milky but translucent | 1 | 2.59 | | | 0 | | |
| 10 | Milky | 1 | 2.94 | II | | 0 | | |
| 11 | Thick, milky,<br>Creamy | 1 | 3.62 | 7 | 2.66 | 0 | | |
| 12 | Thick, creamy | 2 | 9.23 | 2 III | 9.23 | 0 | | |

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[1] Keith, N. M., Rowntree, L. G., and Geraghty, J. T.: A Method for the Determination of Plasma and Blood Volume, Arch. Int. Med., October, 1915, xvi, pp. 547-576.

[2] Haldane, J., and Smith, J. L.: The Mass and Oxygen Capacity of the Blood in Man, Journ. Physiol., 1900, xxv, p. 331.

[3] Miller, J. R., Keith, N. M., and Rowntree, L. G.: Plasma and Blood Volume in Pregnancy, Jour. A.M.A., Aug. 28, 1915, lxv, pp. 779-782.

### CLOUDY PLASMA.

That increasing opacity of the plasma indicates increase of the fatty substances is an old belief. This was here proportional with the *greater* degrees of density, but with the lesser not at all so. In Table XXVII the total-fat average shows no significant increase through the 7 groups "clear" to "muddy or very cloudy"; and jumps up only when the plasma becomes "somewhat milky."

The term "lipemia" (Greek λῐη, with a short i, by the way) has been avoided in this paper, because of its looseness, meaning to some observers gross creaminess, to others excess of lipoids micro-chemically.

Far the most appropriate name for the latter would seem to be "hyperlipemia," analogous to the familiar hyperglycemia; while for gross milkiness to the naked eye we may well use Widal's "lactescence." The density, or degree of lactescence, of each plasma was in this series described in 12 ways. The fat by Bloor's method in all specimens falling in each group are averaged in Table XXVII.

It shows the uselessness of trying by the cloudiness to predict the lipoid level. It is true that one may group these 12 into 3 broad divisions of some significance, as follows:

TABLE XXVIII.

| | LACTESCENCE | HYPERLIPEMIA |
|---|---|---|
| I. | Clear to very cloudy .... | Total-fat about 1% |
| II. | Somewhat milky to thick milky .............. | Total-fat about 3% |
| III. | Thick creamy ........... | Total-fat about 9% |

But the significance of these is lessened when we reflect:

1. That 93% of the series of bloods were in Group I.
2. That in that group, according to Table XXVIII, the gross appearance foretold nothing, save possibly that "clear" plasmas *average* low.
3. That this low *average* is misleading, since there are clear plasmas with high lipoids, *e.g.*, Blood No. 141 — Hist. No. 786=2.70%.
4. Of the cloudier plasmas in Group II, furthermore, it is easy to find values lower than many in Group I, *e.g.*, in "9, Quite milky," is Blood No. 537 = only 1.39%.

This agrees with the old observation of Widal, Weill and Laudat that "there is no necessary relation between the degrees of lipemia and lactescence."

Widal, F., Weill, A., and Laudat, M.: Semaine Méd., 1912, xxxii, 529.

Bloor has remarked on the clouding up of a clear plasma on standing at room temperature for 24 hours.[8] This has occurred 11 times in the present series.

In these cases the average total-fat was only 0.88, compared with 1.00 for the whole 114 in the broad division which included the 11. Samples of this 24-hour cloudy plasma were worked up in only 2 of these 11 bloods. Table XXIX shows that total-fat and total-fatty-acid tend to rise, lecithin and cholesterol to fall. More figures are needed.

TABLE XXIX.

INFLUENCE OF STANDING 24–48 HOURS.

| SPEC. NO. | | TOT.-FAT | T. F. A. | L. | C. |
|---|---|---|---|---|---|
| 161 | Before standing ........ | 0.93 | 0.68 | 0.25$^{D}$ | 0.25 |
| | After standing 24 hours | 0.98 | 0.73 | 0.07$^{D}$ | 0.25 |
| 157 | Before ................ | 3.25 | 2.67 | 0.46$^{D}$ | 0.58 |
| | After ................. | 3.53 | 3.11 | 0.42$^{D}$ | 0.55 |

### INFLUENCE OF THE VARIOUS FACTORS IN INDIVIDUAL PATIENTS.

The same influences that have been studied in grouped patients may be studied in the different bloods of each individual patient. There were 18 persons who each supplied 10 to 2 specimens, but want of certain determinations on some of these specimens reduced to 14 the number of patients presented in Table XXX. For each person the total-fat in whole-blood on the day after the *maximal, e.g.*, calories, was picked out of Table I and also on the day after the *minimal* calories, etc. The former was then found by calculation to exceed the latter by 9% of the latter's value. When a lipoid value after the maximal calories was *less* than after the minimal it was marked minus. This occurred disconcertingly often, and therefore only tentative conclusions seem justifiable. These are presented in Table XXX, with the most definite first.

Comparing that specimen of a patient's blood which showed his highest *blood sugar* with that showing his lowest, the total-fat in the former averaged 40% higher than the total-fat in the latter.

Comparing that specimen of a patient's blood taken at the end of the 24 hours showing his highest *carbohydrate balance* with that taken at the end of the 24 hours showing his lowest, the total-fat in the former averaged 11% lower than the total-fat in the latter.

Comparing that specimen of a patient's blood taken at the end of the 24 hours with the highest *dietary fat* with that taken at the end of the 24 hours with the lowest, the total-fat in the former averaged 5% higher than the total-fat in the latter.

Comparing highest *calories* with lowest, the total-fat after the former averaged 6% higher than after the latter.

TABLE XXX.

INFLUENCE OF BLOOD-SUGAR, CARBOHYDRATE BALANCE, DIETARY FAT, AND CALORIES.

| HISTORY No. | No. OF SPEC. | B. S. | CH. BAL. | DIET. FAT | CAL. |
|---|---|---|---|---|---|
| 1233 | 10 | +192 | +11 | +9 | +1 |
| 786 | 8 | +225 | −71 | +16 | +20 |
| 610 | 5 | +9 | +9 | +51 | +18 |
| 1070 | 4 | −8 | −23 | | −19 |
| 1085 | 4 | | −7 | +7 | +7 |
| 1213 | 4 | +34 | −5 | +3 | +92 |
| 1196 | 3 | +28 | +28 | −22 | −22 |
| 914 | 3 | +72 | −33 | −33 | −33 |
| 1160 | 2 | −11 | −11 | | −11 |
| 1227 | 2 | −35 | | | |
| 1245 | 2 | +19 | | | |
| 942 | 2 | −31 | | | |
| Total | 12 | +579 −97 | +48 −150 | +86 −55 | +137 −86 |
| Difference | 12 | +482 | −102 | +31 | +51 |
| Average | | +40 | −11 | +5 | +6 |

Any attempt to discuss the relation of these various observations to contemporary views of general lipoid metabolism in diabetes would be superfluous, in view of the exhaustive and recent statements of Bloor, of Allen, and of Joslin.

### CLINICAL SEVERITY.

A further study of the specimens may be made according to clinical severity. Dr. Joslin has been kind enough to make this classification, presented in the Basal Table, beginning with the mildest at the top of the list. With many specimens it was impossible to do this more than approximately, but certainly the three main groups are accurate from a bedside viewpoint, combined with a knowledge of the condition of the urine, the acidosis and the blood sugar. The mild cases are those with a carbohydrate tolerance of 50 grams or more, although occasionally they would go below that. The severe cases, on the other hand, were those which had at some time a carbohydrate balance of 10 grams or less, though they often were above that level. When these three groups are each averaged, as in Table XXXI, it is seen that there is a progressive rise in the columns for Bloor's fat-method, total-fatty-acid, glycerides, and total-lipoids; but in lecithin and cholesterol there is very little difference between the mild group and the moderate group, and the rise is marked only in the severe group.

If the clinically mild cases are now subdivided into those with renal involvement and those without, it will be seen that the total-fatty-acid in the whole blood and the total-lipoids in the plasma are slightly higher in the nephritic group, as might be expected. That this difference is so slight, and that it appears in so few columns, is, however, natural enough. For, although "renal block" holds back sugar markedly, it can hardly "retain" fat when fat so seldom gets through. In the scanty literature on urinary lipoids are found reports varying from only 0.0002% fatty-acid to 0.44 grams ether-extract per 24 hours.

TABLE XXXI.

INFLUENCE OF CLINICAL SEVERITY.

| | | No. OF BLOODS | TOTAL-FAT | | TOTAL FATTY ACIDS | | | L. | | | C. | | | GLYCERIDES | | TOTAL LIPOIDS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | W. B. | Pl. | W. B. | Pl. | Cps. | W. B. | Pl. | Cps. | W. B. | Pl. | Cps. | Pl. | Cps. | Pl. |
| Mild | | 32 | 0.83 | 0.90 | 0.59 | 0.64 | 0.45 | 0.32 | 0.24 | 0.42 | 0.24 | 0.26 | 0.21 | 0.38 | 0.18 | 0.98 |
| Moderate | | 37 | 0.91 | 1.06 | 0.65 | 0.75 | 0.48 | 0.33 | 0.28 | 0.40 | 0.26 | 0.30 | 0.20 | 0.46 | 0.23 | 1.16 |
| Severe | | 55 | 1.41 | 1.80 | 1.01 | 1.28 | 0.62 | 0.40 | 0.40 | 0.40 | 0.41 | 0.51 | 0.24 | 0.84 | 0.38 | 1.98 |
| Mild | with nephritis | 12 | 0.87 | 0.93 | 0.63 | 0.66 | 0.53 | 0.32 | 0.24 | 0.43 | 0.24 | 0.26 | 0.22 | 0.41 | 0.24 | 1.01 |
| | without nephritis | 20 | 0.86 | 0.88 | 0.54 | 0.63 | 0.40 | 0.32 | 0.24 | 0.41 | 0.25 | 0.25 | 0.21 | 0.36 | 0.13 | 0.97 |
| Severe | with acidosis | 21 | 1.32 | 1.66 | 0.99 | 1.23 | 0.58 | 0.39 | 0.38 | 0.40 | 0.33 | 0.43 | 0.22 | 0.82 | 0.32 | 1.81 |
| | without acidosis | 34 | 1.49 | 1.87 | 1.02 | 1.31 | 0.64 | 0.41 | 0.41 | 0.40 | 0.46 | 0.57 | 0.25 | 0.86 | 0.43 | 2.07 |

Hybbinette, S.: Ueber die Gegenwart von nicht fluchtige fette Sauren im normalen Menschenharn, Skand. Arch. für Physiol., 1897, vii, pp. 380-384.

Reale, E.: Ausscheidung der Fette durch den Harn, Riv. di Clin. e Therap., 1897, No. 4; also reviewed in Malys Jahresbericht über die Fortschritte der Thierchemie, 1897, xxvii, p. 43.

If the clinically severe cases are subdivided into those with acidosis and those without, it will be seen that the lipoids run higher in the latter group, right across the page. This is surprising, because a similar comparison already made between the specimens with acidosis and those without in the entire 131 specimens, instead of in these 53, shows the reverse, namely, the higher lipoids in the specimens *with* acidosis, as, indeed, would be expected.

### CONCLUSIONS.

1. The most satisfactory *single determination* for following a diabetic patient is Bloor's fat-method (total-fat) on whole blood.
2. There is a lipoid *threshold*, by Bloor's method about 0.7%, analogous to the glucose threshold of 0.1%.
3. A normal Bloor-fat-value was found only 9 times in 124 bloods, *i.e.*, only about 7.0% of diabetics come inside the threshold of the normal range.
4. The lipoid increases in diabetes are *most marked* in:
    - I. Glycerides, then:
    - II. Total-fatty-acid,
    - III. Cholesterol,
    - IV. Phosphatides.
5. The increase of cholesterol *beside* the glycerides seems indeed pathognomonic of the long-standing hyperlipemia of diabetes, contrasted with the acute hyperlipemia of overfeeding which has been shown by Bloor to consist of only increased fatty acid.
6. The *maximal* total-lipoid value of this series was 16.3%.
7. The *plasma* exhibited much greater increase of lipoids than the corpuscles.
8. After ether *anesthesia* in one case, total-fatty-acid was increased, followed by a fall below that patient's level before anesthesia. Phosphatide and cholesterol were unchanged.
9. *Sex*, in diabetes, makes no significant difference in lipoid level.
10. The greater the *duration*, the lower the lipoids.
11. The higher the lipoids, the more unfavorable is the *prognosis*. The danger of deranged fat-metabolism: acidosis and coma!
12. *Over*weight at the time blood is taken is accompanied by *slightly* high lipoids.
13. *Under*weight at the time blood is taken is accompanied by *markedly* high lipoids.
14. The greater the *loss of weight*, *i.e.*, from maximal weight (presumably onset) to weight at time the last blood was taken, however, the *lower* the lipoids, compared with those patients whose weight-loss has been less.
15. High *dietary* fat is only roughly followed by higher lipoids.
16. With *acidosis* the lipoids are above the level in diabetes without acidosis. The rise is about twice as great in *moderate* as in severe acidosis. This paradox may be related to the frequent finding that acidosis is most marked in acute cases, which presumably have not yet had time to pile up excess fat.
17. With increasing *carbohydrate balance* the lipoids decrease.
18. *Hyperglycemia* is only roughly accompanied by hyperlipemia. The latter, furthermore, runs much more closely parallel to the patient's general condition, and promises, therefore, to displace blood sugar from its present position as an index to prognosis and treatment.
19. When lipoids are high, the *percentage of corpuscles* in whole blood is apt to be either abnormally low or abnormally high. The general diabetic average is below normal.
20. The term "lipemia" is loose and therefore undesirable. *Hyperlipemia* (supernormal lipoids) is not paralleled by *lactescence* (cloudy plasma), except when extreme. When, however, the lipoids are only moderately supernormal (as is true in 93% of the specimens in this series), then the plasma cloudiness is by no means proportional. This series shows clear plasmas, which, when tested, were found hyperlipemic, and cloudy plasmas which were found to have normal lipoids.

## Medical Progress.

### PROGRESS IN PEDIATRICS. A RÉSUMÉ OF THE LITERATURE OF INFANTILE SCURVY DURING THE PAST FIVE YEARS.

BY JOHN LOVETT MORSE, A.M., M.D., BOSTON.

*Symptomatology.*

HESS (*Jour. Amer. Med. Assn.*, 1915, Vol. lxv, p. 1003) in 1915 called attention to enlargement of the heart, especially to the right, in infantile scurvy. This enlargement is demonstrable both by percussion and by the roentgen ray. Necropsies show that the enlargement is sometimes due to dilatation and sometimes to hypertrophy, but more often to dilatation. The enlargement is chiefly of the right ventricle. The rate of the pulse is also increased.

He also states that subcutaneous edema is one of the most constant phenomena of infantile scurvy. It deserves special mention because it appears in a peculiar clinical form and is frequently one of the earliest indications of threatening scurvy. It appears first in the eyelids, especially the upper. It often manifests itself as a firm edema over the lower end of the tibia, infiltrating the skin, and is easily overlooked. as it does not pit on pressure. The edema is due to a nutritional disturbance of the smaller vessels and may also infiltrate the muscles

When this occurs in the thigh and causes swelling, it may be mistaken for subperiosteal hemorrhage.

He believes that the nervous system is also involved, because of the superficial tenderness in the extremities, the exaggeration of the knee-jerks and a neuro-edema of the optic discs, which are present in many cases.

In the course of his studies of a series of cases of scurvy at the New York Hebrew Infant Asylum Hess also found (*Amer. Jour. Dis. of Children,* 1916, Vol. xii, p. 152) that growth, in both length and weight, is markedly affected in the development of infantile scurvy. There is a cessation of growth, and a stationary plane is maintained for weeks or months. Super-growth occurs when an antiscorbutic is added to the food. The cessation of growth in length shows a much greater disturbance of metabolism and nutrition than does that in weight, because simple malnutrition does not affect this function either in infants or young animals.

In a still more recent paper Hess (*Jour. Amer. Med. Assn.,* 1917, Vol. lxviii, p. 235) describes a cardiorespiratory syndrome, which often develops early. The pulse and respiration are decidedly increased in rate, but there is no discomfort. There is polypnea rather than dyspnea. Cardiographic tracings show a simple tachycardia, with at times an exceptionally tall T-wave. The fact that the rate of the respiration is increased, as well as that of the pulse, shows that the symptoms cannot be due to an alteration in the heart muscle. They must be due to a disturbance of the nervous mechanism controlling this dual symptom, probably to an involvement of the pneumogastric nerve.

He also emphasizes the fact that scurvy presents many symptoms before the development of the florid stage. He describes three stages of scurvy: the latent, the subacute and the florid. The symptoms of the latent stage are stationary weight, pallor, anorexia, edema, exaggerated knee-jerks and the cardio-respiratory syndrome. In the subacute stage the symptoms of the latent stage are more marked, and enlargement of heart, irritability, slight redness of the gums and slight tenderness of the extremities develop, while the urine often contains a little albumen and blood. The symptoms of the florid stage are of the well-known hemorrhagic type with which all are familiar. The latent and subacute stages often pass unrecognized and are cured by the accidental administration of some antiscorbutic before the florid develops.

### *Pathology.*

Hess and Fish (*Amer. Jour. Dis. of Children,* 1914, Vol. viii, p. 385) have recently made a study of the blood in this disease to determine the cause of the hemorrhages. They found that the clotting power of the blood in scurvy was, as a rule, slightly diminished. This diminution was not, however, constant, and cannot, therefore, be regarded as an essential manifestation of the disease or sufficient to account for the hemorrhagic tendency so characteristic of it. They found that there was no deficiency of calcium or blood platelets and no excess of antithrombin. They then studied the blood vessels by means of what they term the "capillary resistance test" and found that there was a weakness of the vessel walls in scurvy. This weakness is also present in other conditions than scurvy and is, therefore, not pathognomonic of it. It seems evident from their work, however, that the hemorrhagic tendency in scurvy is due to a weakness of the vessel wall rather than any change in the blood.

Nobécourt, Tixier and Maillet (*Archiv. d. Méd. d. Enfants,* 1913, Vol. xvi, p. 241) made a study of the blood in two cases and found anemia with leukocytosis. There was no rule evident, however, as to the relative proportions of the different forms of white cells. They call attention to a myeloid reaction of the blood, shown by the presence of both basophilic and neutrophilic myelocytes, which they attribute to an intense, plastic medullary reaction.

Bahrdt and Edelstein (*Ztschr. f. Kinderheilk.,* 1913, Vol. ix, p. 415, and 1914, Vol. x, p. 352) analyzed the organs of an eight-months-old baby, dead of scurvy, which showed no evidences of rickets. The ash of the bones was much less than normal. They contained from one-fifth to one-third of the normal amount of calcium, and there was a corresponding diminution in the phosphorus. The sodium and potassium were somewhat increased. There was also a diminution in the amount of calcium in the muscles. The salts in the other organs were apparently normal.

### *Etiology.*

Lane-Claypon (Reports to the Local Government Board on Public Health, 1912, New Series, No. 63) gave a careful review of the literature regarding the effect of the heating of milk on the production of infantile scurvy in 1912. Morse (BOSTON MEDICAL AND SURGICAL JOURNAL, 1914, Vol. clxx, p. 504, and *Trans. Amer. Ped. Soc.,* 1914, Vol. xxvi, p. 61) called attention to the rapid increase in the number of cases of infantile scurvy treated in the Out-patient Department of the Boston Children's Hospital during the preceding six years, and the parallelism of this increase with that in the pasteurization of milk in Boston during this period. He did not claim that the pasteurization of the milk was the cause of the increase, but merely called attention to these figures as suggesting that it might be, and that it might, at last, play a part in the etiology of scurvy. In former years most of the babies which developed scurvy were fed on proprietary foods. In recent years the heating of foods prepared with milk was the most constant factor. Hess and Fish (*Amer. Jour. Dis. of Children.* 1914, Vol. viii, p. 385) stated in 1914 that during the past three years a considerable number of cases of scurvy had developed at the New York Hebrew Infant Asylum in babies fed on pasteurized milk. In 1912, when the first cases were noted, the food was heated at 165° F. for twenty minutes. At this time several cases developed, owing to the fact that through an oversight orange juice was not given. Since then the milk has been heated at 145° F. for thirty minutes. Nevertheless, several cases of scurvy developed on this diet, orange juice having been omitted for experimental purposes. Others did not develop scurvy, although on the same diet. He concluded, therefore, that the pasteurized milk was not the sole factor in the production of the disease. That the pasteurization of the milk played an important part was shown, however, by the recovery of the babies when the pasteurization was stopped. the food otherwise remaining the same. Single cases of scurvy developing in babies fed on pasteurized or boiled milk have also been reported by several observers.

Hess and Fish (*loc. cit.*) state that their experience shows that the infectious diseases do not play an essential rôle in the production of infantile scurvy. They also state that almost all of the babies that developed scurvy showed evidences of the "exudative diathesis." The association was so evident that they have no hesitation in considering that there is a close inter-relationship between the two conditions. They believe that the "exudative diathesis" predisposes to the development of scurvy.

Talbot and Peterson, and Dodd, in their articles in THE BOSTON MEDICAL AND SURGICAL JOURNAL in 1913 (Vol. clxix, pp. 232 and 237) reviewed the literature of experimental scurvy in animals up to that time. Moore and Jackson (*Jour. Infec. Dis.*, 1916, Vol. xix, p. 478, and *Jour. Amer. Med. Assn.*, 1916, Vol. lxvii, 1931) have since then corroborated the findings of other observers, that inanition does not produce scurvy. They also found that cow's milk in any form, whether boiled, pasteurized or raw, not only does not cure scurvy in guinea pigs, but actually causes it. Condensed milk and mixtures of casein and water also caused it. So did Horlick's Malted Milk, Nestle's Food and Mellin's Food. The presence or absence of milk in these foods apparently made no difference. Goat's milk, however, did not cause it. They also determined by experiments that the lactose in milk is not the cause of scurvy in guinea pigs and that scurvy is not due to a lack of lime salts. They call attention to the facts that a diet which is sufficient for growth and maintenance in one species may be adequate for another, sufficient for maintenance in another, and produce one of the deficiency diseases in a third; and that conclusions based on dietary experiments on one species of animals can be applied only to that species. They state that their results show nothing to contradict the belief that milk carries both the fat-soluble and the water-soluble vitamins, but merely show that milk in every form lacks something which is necessary to the guinea pig.

Funk has recently called attention in his book (*"Die Vitamine,"* etc., Wiesbaden: J. F. Bergman, 1914) to the significance of the so-called vitamins in physiology and pathology, especially in relation to the etiology of what he calls the "avitaminoses," namely, beriberi, scorbutus, pellagra and rickets. He believes, and advances strong evidence to prove, that these diseases are due to the absence of certain vital substances in the food, that is, the vitamins. He shows from his own work and that of others that milk contains a considerable number of these antiscorbutic substances as well as a substance which materially favors the growth of young animals. The development of scurvy in infants taking foods which contain no milk may be explained, therefore, by assuming that these foods do not contain the essential vitamins which milk does contain. The vitamins are, in general, very sensitive to heat. Those in milk are relatively stable. They are, however, partly destroyed by heating milk for a short time, and totally destroyed by long heating or sterilization. The development of scurvy in babies taking heated milk, and the greater frequency of the disease when the food is boiled or sterilized than when it is pasteurized, may be explained by assuming that the vitamins are partly or wholly destroyed by the heating, the destruction being more or less complete, according to the degree and duration of the heating. Scurvy sometimes develops, however, in babies taking raw milk, or even in those that are on the breast. His explanation of the development of scurvy on a diet of raw milk is that in such instances the milk is deficient in vitamins. In support of this explanation he brings forward evidence to show that the amount of the vitamins in the milk varies with the amount of vitamins in the food of the cows. An example of the influence of the food of the cows upon the amount of vitamins in the milk is the fact that their milk contains less vitamins in the winter, when they are eating dry food, than in the summer, when they are eating green food. The development of scurvy in infants on the breast may be explained in a similar way. He calls attention to the fact, moreover, that the vitamins are diminished in the milk of women who are underfed.

Hess (*Jour. Amer. Med. Assn.*, 1915, Vol. lxv, p. 1003) calls attention to the fact that enlargement of the heart, edema and nerve degeneration, which occur in scurvy, are prominent symptoms in beriberi, which is, without question, a deficiency disease, and considers it a strong argument that scurvy is also a member of this group. The improvement of babies with scurvy when wheat middlings are added to the diet he considers further proof.

McCollum and Davis (*Jour. Biol. Chem.*, 1915, Vol. xxiii, p. 181) concluded, from their studies of rats which failed to grow and live on diets composed of purified food elements, that there were lacking in such food mixtures two essential substances or groups of substances. McCollum and Kennedy (*Jour. Biol. Chem.*, 1916, Vol. xxiv, p. 491) think that the term "vitamins" does not accurately describe these substances, and propose the terms "fat-soluble A" and "water-soluble B" for them. The first is found in abundance in butter-fat and egg-fat, and the latter in the leaves of plants, but only to a small amount in their seeds.

McCollum and Pitz (*Jour. Biol. Chem.*, 1917, Vol. xxxi, p. 229) found, as did Jackson and Moore (*Jour. Infec. Dis.*, 1916, Vol. xix, p. 478, and *Jour. Amer. Med. Assn.*, 1916, Vol. lxvii, p. 1931), that the addition of milk to a diet of oats did not prevent the development of scurvy in guinea pigs, and conclude, therefore, that the lack of "fat-soluble A" cannot be the cause of scurvy. They also conclude, from a series of experiments on rats, that the "water-soluble B" must have been present in the oats. Therefore, they believe that scurvy in the guinea pig cannot be due to a lack of any specific substance of this class. Consequently they conclude that scurvy is not a deficiency disease in the sense in which the term has been recently used.

They found that in guinea pigs which died of scurvy on a diet of oats and milk, the stomach, small intestines and lower colon were empty, while the cecum was distended with putrefying feces. The cecum of the guinea pig is very large and delicate. They argue, therefore, as follows:

The guinea pig can thrive only on a diet which leads to the formation of bulky and easily eliminable feces. Diets such as oats do harm only in that they form pasty feces, which cannot be passed out of the delicate cecum. Putrefaction occurs, which injures the cecal wall, which allows the passage of bacteria or toxins, which by their action on the walls of the capillaries produce the characteristic symptoms of scurvy. They found, further, that the addition of laxatives to the food which produced scurvy prevented or delayed its development. They believe that orange juice does good simply because of its laxative action. They do not go so far as to claim that the cause of scurvy in infancy is colonic stasis, with the absorption of toxins or bacteria, but think that their experiments lend support to this belief. The chief objections to their arguments are that conclusions based on dietary experiments in one species of animals cannot be applied to others, or those on animals to man, that the infantile cecum is not especially large or delicate, and that laxatives do not cure scurvy in infants.

Jackson and Moody (*Jour. Infec. Dis.*, 1916, Vol. xix, p. 511) carried on some experiments to determine whether certain small stained bodies which were seen in the sections of the scorbutic lesions of the guinea pigs studied by Jackson and Moore (*loc. cit.*) were bacteria. They isolated a diplococcus of low virulence, with a tendency to form chains and to produce green on blood agar, from the crushed tissues of scurvy lesions. Pure strains of these organisms, when introduced into the circulation of guinea pigs and rabbits living under ordinary conditions and taking suitable diets, gave rise to hemorrhagic lesions in the bones, joints, muscles, lymph glands or gums. Bacteria resembling these organisms were frequently seen in the microscopic sections of the scorbutic lesions. Jackson and Moore (*loc. cit.*) found, however, that cultures from the heart's blood of guinea pigs ill with scurvy produced by a milk diet were sterile, and that the passage of blood from these animals to normal animals did not produce the disease. Furthermore, guinea pigs fed on broth cultures of hemolytic and green-growing streptococci did not develop any signs of scurvy. Jackson and Moody refrain from drawing any definite conclusions as to the etiological relations of the organisms which they found to scurvy. McCollum and Pitz (*loc. cit.*), however, use their results as strong arguments in favor of their own conception as to the etiology of scurvy.

### *Treatment.*

Hess and Fish (*Amer. Jour. Dis. Children*, 1914, Vol. viii, p. 385) found, as have others, that the boiling of orange juice for five or ten minutes does not destroy its antiscorbutic qualities. They also found that the juice of orange peel is as efficacious as orange juice, and suggest that on account of its cheapness it be used instead of orange juice. They prepared the juice by adding one ounce of finely-grated orange peel to two ounces of water and sweetening it. They found that the administration of small amounts of cooked vegetables, mostly in the form of carrots, did not prevent the development of scurvy. Freise (*Monatschr. f. Kinderheilk.*, 1914. Vol. xii, p. 687), however, cured a case of infantile scurvy by the use of an alcoholic extract of beets, the diet remaining otherwise the same. Hess and Fish (*loc. cit.*) also obtained good results with potato, boiled and mashed. Potato flour, however, had no antiscorbutic action. They recommend the use of potato water, made by adding one tablespoonful of boiled and mashed potato to a pint of water, in place of barley or other cereal waters. The potato water is inexpensive, the starch in it has the same colloidal action as that in the cereal waters, and it acts as an antiscorbutic, which the others do not. They found, as have others, that cod-liver oil and olive oil neither cure nor prevent the development of scurvy.

Hess (*Jour. Amer. Med. Assn.*, 1915, Vol. lxv, p. 1003) tried adding wheat middlings to the food on account of the similarity of many of the symptoms of scurvy to those of beriberi. They had a slight, but, compared with orange juice and potato, unimportant antiscorbutic action. He also gave wheat germ both as a cereal and as a watery extract (*Amer. Jour. Dis. of Children,* 1917, Vol. xiii, p. 98). They had some antiscorbutic power, but not enough to make them of value from either a practical or clinical standpoint. He also tried autolyzed yeast and a desiccated yeast powder, because of the resemblance between the symptoms of scurvy and beriberi. Yeast proved to be of no value, however, either as a prophylactic or curative agent, but showed itself to be a stimulant to growth.

Rueck (*N. Y. Med. Record,* 1917, Vol. xci, p. 152) treated a very marked case of scurvy, with bleeding gums and marked anorexia, by two transfusions of human blood. The bleeding stopped and the appetite improved. He thinks that the blood served as a food in itself, helped to digest the food which the baby took and stimulated the hematogenetic centers to assume their normal functions. He also gave the baby modified milk, but does not state its composition, or whether it was given raw or heated. He began to give orange juice ten days after the first transfusion.

Since this article was written Hess has published another paper (*Amer. Jour. Dis. of Children,* 1917, Vol. xiv, p. 337) in which he concludes from a further study of the records of the cases on which he based his previous papers that aging of the milk seemed to play a greater rôle in the production of scurvy than heating, whether the milk was pasteurized or raised to the boiling point. He states that even raw milk on aging loses its antiscorbutic properties. In this paper he revises most of the opinions and conclusions given in his previous papers, and states that infantile scurvy is not a simple dietary disease but an intestinal intoxication or an autointoxication due to the overgrowth of harmful bacteria in the intestine. He states that it is the product of an unbalanced flora which is no longer controlled by a proper dietary. He thinks that the kidneys play a considerable rôle in infantile scurvy, and that its clinical course depends to some extent on the activity of their functions, toxins being eliminated by this route. He apparently now believes that the curative action of orange juice is due to its influence on the intestinal flora and its diuretic effect. His change of mind is seemingly largely due to the work of Jackson and McCollum and their associates, which has been cited in the previous paragraphs. In the reviewer's opinion his arguments are unconvincing and his conclusions not justified by the data on which they are based.

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Medical Bequests.—The will of the late Mrs Charles H. Colburn, of Milford, Mass., who died recently in Paris, was filed at Worcester, Mass., on Jan. 24. It contains a bequest of $20,000 to the Milford Hospital, and establishes a fund of $100,000 at the Harvard Medical School for research in tuberculosis.

## Book Reviews.

*Kirk's Handbook of Physiology.* With American Revision. By Charles W. Greene, A.M., Ph.D. New York: William Wood & Company. 1917.

This revision of a well-known physiology leaves the book still in that group of texts which present the subject from the structural point of view. Each division is introduced by extensive and well illustrated histological accounts of the tissues involved. There is no doubt that such presentation is necessary for elementary teaching, but in medical school physiology and for graduate reference, it is of very questionable value, since the reader in both these instances obtains his anatomical information from more complete sources.

In the presentation of the actual physiological material, Professor Greene has maintained a simplicity and directness which is admirable. Criticism cannot treat so much the material presented, as it can the very obvious omissions. A text for medical school use which contains no mention of electrocardiography, no explanation of the typical electrocardiogram, material so easily and profitably introduced in discussing the spread of the contractile disturbance in the heart, can hardly be adequate. Other vital omissions occur in the very incomplete character of the discussion of the electrical changes involved in muscular contraction and the passage of the nerve impulse, and in the absence of mention of the venous pulse. It is needless to cite further similar defects which express the sacrifice one must make in presenting a histological type of physiology. It is very doubtful whether such texts can continue in medical school use, since they provide too unsubstantial a foundation for modern clinical medicine and surgery.

*Diseases of the Skin.* By Richard L. Sutton, M.D., Professor of Diseases of the Skin, University of Kansas School of Medicine, etc. With 833 Illustrations and 8 Colored Plates. Second edition. Revised and enlarged. St. Louis: C. V. Mosby Company. 1917.

The excellence of Sutton's textbook on Dermatology was emphasized in these columns at the time of the appearance of the first edition. This second edition has offered the author an opportunity to "supply supplemental matter in a few instances, as well as to cover the important literature for the entire year 1916, and to eliminate a number of typographic and other minor errors." Gangrenous Balanitis, Atrophy of the Mucous Membranes of the Tongue and Mouth, and Atrophy of the Fatty Layer of the Skin, are the principal new topics discussed. 140 new illustrations have been added.

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ERNEST GREGORY, *Manager*,
126 Massachusetts Ave., Corner Boylston St., Boston, Massachusetts.

## MILITARY ANTI-TUBERCULOSIS PROGRAM PERFECTED.

PLANS for a complete program for the Prevention of Tuberculosis in the Army have been perfected by the National Association for the Study and Prevention of Tuberculosis, working in coöperation with the Surgeon-General, the Y.M.C.A., and other agencies. This, it is predicted, will put the impending second draft on a better health basis than the first. The program will include, not only a follow-up for every man discharged on account of tuberculosis, but a thorough-going health educational campaign among the soldiers.

Prior to the first draft, the National Association began to outline a preventive campaign. Owing to the magnitude of the task and the many practical delays in perfecting and applying the details of this scheme, the results were not as encouraging as might be expected. This was due to the fact that the report of names of men rejected by the draft on account of tuberculosis was inadequate, the slowness of the machinery in getting under way, and the many difficulties in determining the status of the men.

Inasmuch as these enlisted or drafted men do not become accepted soldiers until after their probationary period, lasting from three to six months in the various services, the Government assumes no responsibility for the after-care of those whose health breaks down during that period. Hence, this problem belongs to the civilian boards of health and the unofficial health organizations.

The National Association program falls into two main divisions: (*a*) follow-up work, and (*b*) educational work. The first obstacle to the follow-up program was Section Eleven of the Selective Service Regulations regarding the second draft, which forbids giving a record of a man's condition to any one except certain designated officials. The National Association officers, however, placed before the War Department the importance of this work, and were influential in persuading them to open the records of rejected men to state and local boards of health throughout the country, through the United States Public Health Service and the Council of National Defense.

Inasmuch as the above section of the regulations does not apply to men dismissed from training camps after they have passed draft boards, the Association arranged with the Surgeon-General and the division surgeons in camps to receive the names of all men thus dismissed. These lists are divided up by states and forwarded to state associations and state boards of health, for follow-up work. Where men are referred to localities where there are not at present facilities for this follow-up work, the Association will use its good offices to promote the establishing of such facilities.

In the meantime, the Medical Department of the Army has perfected its machinery for weeding out these tuberculosis cases. Every man passed by the draft board, after going into camp is examined by the regimental surgeon, re-examined by a tuberculosis board, and then, if suspected of tuberculosis, again examined by a tuberculosis expert. This follows a general policy mapped out and recommended by the National Association.

A large number of men have already been accepted into the service who were known to be tuberculous, many of them formerly inmates of tuberculosis sanatoria. Part of the Association's work has been to get in touch with every tuberculosis sanatorium and dispensary in the country and compile lists of all recent male inmates of draft age, giving the history of their cases, and whether or not it was known if they were in the army at present. Hundreds of such names have already been received. These data are forwarded to the training camps, the men are located, and the results are reported back to the sources of information.

Furthermore, the Association has sent a letter to all of its fifteen hundred local coöperating agencies, giving the provisions of the second draft and urging that these agencies procure the names and addresses of all the men of military age in their section who are known to have tuberculosis; get in touch with these men, and arm them with the necessary affidavits to prevent, if possible, their being passed by the draft board, and recommend to the local draft boards the names of the approved tuberculosis experts in their section.

The Association is also coöperating with the Surgeon-General's office to aid the Government in providing sanatoria for those men who have been discharged from the service on account of tuberculosis after their probationary period has expired. All full-fledged soldiers and sailors returned from France or other stations will be cared for as near to their own homes as possible, in sanatoria accommodations provided by the Government. The Government intends to utilize, as far as possible, existing institutions.

From the United States Marine Corps, the National Association has secured each month a report of men rejected for tuberculosis from all its recruiting stations, and these men will receive the regular follow-up attention.

From the second, or educational, division of the program, it is hoped to derive the greater ultimate good by the establishment of fundamental preventive measures among the well.

The National Association is interested in any kind of educational campaign among the men in the various military camps that will tend to promote interest and information with regard to the control and prevention of communicable diseases, and toward the promotion of public and individual health in general. In the mobilization of such large numbers of men in various camps throughout the United States, there have developed an unusual number of somewhat serious epidemics of colds, coughs, pneumonia, measles and various other respiratory and communicable diseases. That all these diseases can be controlled by education and by the exercise of adequate public health measures has been clearly demonstrated in the civilian population throughout the United States. Most of these epidemics are spread through ignorance and carelessness. It is inevitable where large numbers of men from all walks of life, and with all possible diseases and variations of physical habits, are thrown together in somewhat uncomfortable and crowded living conditions, that there will be an immediate increase in the amount of sickness from communicable diseases. It must be obvious, however, to even the most superficial observer, that if these men can be taught to maintain a reasonable standard of personal hygiene, and can be given a knowledge of the methods and principles of the control of communicable diseases, a rapid diminution in the sickness rate will follow.

In cöoperation with the Educational Committee of the National War Work Council of the Y. M. C. A., the National Association will furnish a number of stock lectures dealing with tuberculosis, together with lantern slides to illustrate them. It will also arrange to put the educational secretaries of each of the camps in touch with public lecturers in and around their respective camps. The Association has requested the War Department to give careful consideration to the desirability of appointing one or more special officers detailed to lecture on tuberculosis and allied health subjects in all the army camps throughout the country.

The Association has prepared a special circular entitled, "Red Blood," giving in brief and attractive form a message to the soldier relative to personal fitness. A health "Don't Card" and a Public Health Manual may also be distributed, the latter being a text-book of personal hygiene.

The Association will also arrange to distribute, through the departmental executives of the Y. M. C. A., a number of special tuberculosis exhibits known popularly as "The Parcel Post Exhibit." In connection with these, moving picture films and lantern slides will be used.

The National Association Field Secretary, Dr. Pattison, is visiting the training camps and supervising this educational work.

PHILIP P. JACOBS,

*Assistant Secretary National Association for the Study and Prevention of Tuberculosis.*

## MASSACHUSETTS SOCIETY FOR MENTAL HYGIENE.

In a recent issue of the Journal we made editorial comment upon the latest meeting of the Massachusetts Society for Mental Hygiene, which was held in Boston, on the general subject of shell shock. The Massachusetts Society for Mental Hygiene has now become a well-established and recognized organization, and has already accomplished work of a considerable amount of value. As an indication of the character of this work may be mentioned its publications, eleven in number, which include articles on Psychopathic Hospitals and Prophylaxis, by Dr. Frankwood E. Williams; on The Menace of Syphilis to the Clean-Living Public, by Dr. J. Harper Blaisdell; on The Burden of Feeble-Mindedness, by Dr. Walter E. Fernald; on The Relation of Syphilis to Mental Disease, by Dr. Samuel T. Orton; and on The After-Care of Mental Patients, by Dr. Henry P. Frost. The Society also has a corps of about thirty speakers, men and women, who are authorities on the various phases of mental hygiene, who will, without charge, deliver public addresses on such subjects as the following: Preventable Psychoses and How to Prevent Them, by Dr. E. Stanley Abbott; Mental Disease and Crime, by Dr. V. V. Anderson; The Defective Child and the Schools, by Miss Frances E. Cheney; The Practical Phases of Inebriety, by Dr. Irwin H. Neff; and Mental Pitfalls of Adolescence, by Dr. Henry A. Stedman.

The Society, as an agency of preventive medicine, merits professional recognition for the work which it has already accomplished, and should be able to go on to accomplish still more of value as its methods become developed.

## WAR-RISK INSURANCE.

In last week's issue of the Journal appeared an editorial on War-Risk Insurance. In this editorial, statement was made that this insurance covered partial as well as total disability. Further information from the director of the Bureau of War-Risk Insurance now states that this is incorrect. War-risk insurance covers only total and permanent disability. No provision is made for payment of partial disability.

## MEDICAL NOTES.

Decline of German Birth Rate.—A report from Germany states that the rapid decline in birth rate is causing serious anxiety throughout the country. While this decline was, of course anticipated as a direct outcome of war conditions, it is now felt necessary to take direct measures to offset this state of affairs.

"The falling-off of the birth rate is greater in large towns. It is very noticeable, for example, at Dresden, where, in 1903, the number of deaths was 8570; in 1913, 7329; in 1915, 6406. In the years mentioned, the number of births was 15,423, 11,297, 7371, respectively. As rate of mortality does not decline to the same extent, the marked decline in excess of births over deaths necessarily makes itself evident by the number of births in excess of deaths. This fell from 6853 in 1903, to 965 in 1915. There is no doubt the figures of 1916 and 1917 would show a much greater decline. In consequence of this, the greater efforts are being made in Dresden to foster infant life by classes of society who took no interest in such matters before the war.

It would be easy to prove by the examination of statistics of other German towns that what is happening in Dresden is happening elsewhere. Prussia and central Germany are the only places where the decline in the birth rate is less ominous and occurs in places where strong religious influences exist to combat it, as, for example, in the Roman Catholic districts of west Germany, where the population is largely of this faith. Naturally, the hard winter is having a disastrous effect on the population as regards elderly people enfeebled for want of adequate food."

### WAR NOTES.

More Nurses for War.—The American Red Cross has announced that it will require the enlistment of 30,000 more nurses if the prospective needs of the Government are to be met. In order to meet the increasing demands of the Army and Navy Nurse Corps, the Red Cross has modified somewhat its former requirements for enrolment. The age-limit has been lowered to twenty-one years, and in special cases nurses over forty may be accepted. Smaller schools for nurses have been placed on the accredited list, and applicants are judged on their merits.

Medical Advisory Boards.—The following men have been appointed to serve on the Medical Advisory Board for the Winthrop and Boston division, under the Selective Service Law. They are: Dr. Charles L. Scudder, chairman, Dr. Frederick T. Lord, Dr. J. Homer Wright, Dr. Alex. Quackenboss, Dr. E. W. Taylor, Dr Eugene A. Crockett, Dr. George W. Holmes, Dr. W. E. Boardman, and Dr. James I. McLaughlin. Those who will serve on the board for the Boston and Brookline division are Dr Henry L. Houghton, chairman, Dr. George B. Rice, Dr. Gardner H. Osgood, Dr. F. W. Coburn, Dr. John H. Payne, Dr. Alonzo G. Howard, Dr. J. Emmons Briggs, Dr. F. C. Richardson, and Dr. W. H. Eaton. Those who will serve on the board for the Milton and Boston divisions are Dr. Henry Jackson, chairman, Dr. F. H. Leahy, Dr. Joshua C. Hubbard, Dr. E. R. Williams, Dr. W. J. Daly, Dr. Harold Walker, and Dr. L. M. S. Miner. The local examination boards for districts in the vicinity of Boston will have their headquarters in the following places:

District 22—Cable Memorial Hospital, Ipswich.
District 25—Addison Gilbert Hospital, Gloucester.
District 26—Beverly Hospital Corporation, Beverly.
District 27—Reading State Sanatorium, Reading.
District 28—Josiah B. Thomas Hospital, Peabody.
District 29—Salem Hospital, Salem.
District 30—Lynn Hospital, Lynn.
District 31—Melrose Hospital, Melrose.
District 32—Charles Choate Memorial Hospital, Woburn.
District 33—Deaconess Hospital, Concord.
District 34—Winchester Hospital, Winchester.
District 35—Malden Hospital, Malden.
District 36—Sims Arlington Hospital, Arlington.
District 37—Waltham Hospital, Waltham.
District 38—Somerville Hospital, Somerville.
District 39—Cambridge Hospital, Cambridge.
District 40—Newton Hospital, Newton.
District 41—Boston City Hospital, Boston.
District 41—Massachusetts General Hospital. Boston.
District 42—Framingham Hospital, Framingham.
District 43—Quincy City Hospital, Quincy
District 44—Norwood Hospital, Norwood.
District 45—Canton Nursing Association, Canton.
District 46—Brockton Hospital, Brockton.
District 47—Sturdy Memorial Hospital, Attleboro.
District 48—Jordan Hospital, Plymouth.
District 49—Morton Hospital, Taunton.
District 50—Union Hospital and City Hospital, Fall River.
District 51—St. Luke's Hospital, New Bedford.
District 52—Yarmouth Junction Hospital.
District 53—United States Marine Hospital, Oak Bluffs.

HEALTH AT ARMY CAMPS.—Report of the week ended January 11 of health conditions at the National Guard and National Army camps states that among the 235 deaths, 149 were caused by pneumonia. Eighty-eight guardsmen died during the week, as compared with 109 the week before, and 147 National Army men, as against 167 the previous week.

"Both the hospital admission and non-effective rates in the Guard and National Army camps increased during the week, with pneumonia generally prevalent. Among the Guardsmen there were 342 new cases of pneumonia, and in the National Army 340. The meningitis situation continued to improve, both in the Guards and National Army, while measles continued to decline in most of the camps. Epidemics of German measles and mumps prevailed in many camps, with scarlet fever increasing in the National Army and decreasing in the National Guard."

### BOSTON AND MASSACHUSETTS.

INFANTILE PARALYSIS CLINIC.—The splendid work which has been carried on by the Harvard Infantile Paralysis Commission in treating children who have been victims of this dreaded disease merits a cordial and generous support, not only from those so afflicted, but from public-spirited people generally.

"Statistics given out yesterday show that 1118 children were examined at the Commission's clinics during the year ending Nov. 20, 1917. Of these, 402 had infantile paralysis prior to 1916, 670 during 1916, and 46 during 1917. The cases which are being followed up at the homes by the orthopedic nurses number 645; by the state field workers of the Commission, 520; and by the Boston Instructive District Nursing Association for the Commission, 125.

State clinics were held at Springfield, Newburyport, Haverhill, Lowell, Lawrence, Quincy, Malden, Melrose, Worcester, Greenfield, North Adams, Beverly and Lynn, with a total attendance of 956. There were 155 clinics at the Children's Hospital, Boston, with a total attendance of 3889."

The Commission, however, is sadly lacking in the necessary funds to carry on its work. Any curtailment of its work would be a public calamity, and, therefore, an appeal is being sent out over the State to raise a fund of $18,000. Checks may be sent to the Commission, in care of Kidder, Peabody and Company, Boston.

FRAMINGHAM HEALTH CONFERENCE.—The quarterly meeting of the National Committee in charge of the Framingham health demonstration was held on January 17. Dr. Baldwin of Saranac Lake presided and Dr. Hatfield of Philadelphia was secretary. Other well-known men who attended the meeting were Dr. Frankel, of New York City; Dr. Kelley, of Massachusetts State Department of Health; Dr. Mahar, of Connecticut; and Dr. Smith, of the United States Public Health Service. Dr. Donald B. Armstrong reported the progress of the work in making a second medical examination of more than five hundred families.

**Week's Death Rate in Boston.**—During the week ending Jan. 19, 1918, the number of deaths reported was 306, against 294 last year, with a rate of 20.34, against 19.85 last year. There were 35 deaths under one year of age, against 33 last year.

The number of cases of principal reportable diseases were: diphtheria, 69; scarlet fever, 42; measles, 108; whooping cough, 76; typhoid fever, 1; tuberculosis, 28.

Included in the above were the following cases of non-residents: diphtheria, 5; scarlet fever, 7; tuberculosis, 1.

Total deaths from these diseases were: diphtheria, 4; measles, 4; whooping cough, 2; tuberculosis, 26.

Included in the above were the following non-residents: diphtheria, 2; tuberculosis, 1.

**Emergency Hospital of State Guard.**—Plans for the equipment of a hospital of 440 beds, under the jurisdiction of the State Guard, are well under way. The Executive Council has appropriated $50,000, and Commonwealth Armory will be utilized for the storage of the equipment, and the great drill shed will be the location of the hospital should a need for it arise. The hospital will have a complete modern operating room with x-ray apparatus and sterilizing room. The personnel of the hospital force, under Colonel Brooks, numbers 72 officers and 173 men, already trained for the work.

**Opposition to Health Insurance.**—The report of the special commission appointed to consider social insurance problems opposes the establishment of a State system of compulsory health insurance. A minority report, however, recommends the appointment of a special commission of five to devote two years' study to the matter. Another minority report recommends extension of medical care of school children.

Among other things, the report of the majority makes this statement:

"The real solution of the health question, it seems, is not indemnification for wage loss during illness, but prevention of illness. To cope intelligently with the sickness problem, therefore, our energies should be directed to making possible the extension and greater efficacy of our preventive work. Since the maintenance of a high standard of public health through the prevention of illness, is more desirable than the *post facto* treatment of disease, the majority believe it would be wiser under the present circumstances to follow a constructive policy of preventive medicine than to initiate any compulsory scheme of health insurance.

After serious consideration of the evidence submitted at the various hearings and of the several studies undertaken in its behalf, the majority has reached its conclusions, and does not feel justified in recommending a bill to establish a system of State health insurance within the Commonwealth.

In connection with its recommendations for the extension of existing voluntary agencies in the State, the report of the majority states that 'as a means of relieving the burden which illness often imposes on those of limited means, the majority of the commission submits recommendations and legislation which it believes will result in the extension and more effective administration of existing voluntary agencies in the Commonwealth. It is our opinion that an ultimate solution of the sickness indemnity question may be partly reached, at least, through the growth and development of voluntary industrial mutual benefit associations now in operation.'

In analyzing the evidence submitted to the commission and the summary of hearings presented at the beginning of its report, the report reads: 'The so-called compulsory contributory system of health insurance has few supporters. There appear to be two serious obstacles to the enactment of legislation of this character, namely, the united opposition of employer and employee to the plan, and the difficulties presented by the constitutional aspects of the question.'

The enactment of a compulsory health insurance law would be in the nature of class legislation, the majority believes. 'We cannot disregard the objection put forward by labor bodies and others,' the report says, 'that compulsory contributory health insurance is class legislation—inasmuch as it taxes one class of citizens,—the inherently healthy—for the benefit of the smaller, but less fortunate, group on which the burden of illness falls.'

The report of the minority members takes issue with that of the majority members at many points. 'Health insurance legislation,' it states, 'may be halted temporarily by the war, but the ultimate acceptance of it seems to us to be beyond question. . . A shortage of labor, due in part to the drafting of a great body of our young men for the National Army and the cessation of immigration, makes it necessary for a great number of workers to labor long hours and under high tension. European countries are awaking to the fact that their workers must be provided for after the war. The American workmen are already asking what the Government is going to do for them after the war. Thus it would seem to us that the war could be an added argument for health legislation rather than for delay.'

Continuing, the report of the minority states: 'In the very limited time, however, in which the Commission has had to consider the question, the minority feel that sufficient evidence and proof have already been presented to show the vital need of sickness insurance as a means of relief to the overburdened wage-earners in the Commonwealth. While the minority refrain at this time from submitting a bill establishing health insurance because we have realized some of the difficulties involved in enacting a measure of such great importance, however, we are thoroughly convinced that a system of non-contributory health insurance is the only solution of the problem of sickness and its contingencies. The principle of non-contributory health insurance appeals to us by far the eminently fair and correct means of solving the problem.'

In recommending further study of the question, the minority says it is submitting a bill to the Legislature providing for the appointment by the governor of a commission of five persons, one of whom shall be a representative of labor, for a period of two years, in which to investigate the question. An appropriation of $25,000 is asked for the commission."

## Miscellany.

### RESOLUTIONS ON THE DEATH OF MR. RUETER.*

CONRAD JOHN RUETER, son of Henry Herman and Mary Emily (Domansky) Rueter, was born in Roxbury, Massachusetts, September 26, 1863, and died in Boston, December 18, 1917.

Mr. Rueter graduated from the Roxbury Latin School in 1880, and from Harvard College in the Class of 1884. He studied one year in the Harvard Law School, and another at the Boston University Law School; he was admitted to the Suffolk Bar in July, 1886. In August of the same year he went to Germany to familiarize himself with other systems of jurisprudence, and studied particularly Roman law, at Bonn. He returned to Boston late in 1887 and began the active practice of his profession at 23 Court Street.

While at Cambridge he was a faithful student, receiving his bachelor degree *cum laude*, and an honorable mention in English composition. While an undergraduate he joined the Everett Athenaeum and the Pi Eta Society, and was also a member of the Varsity lacrosse team at a time when Harvard was a leader in this branch of sport.

In 1896 Mayor Quincy appointed him trustee of the Boston City Hospital, a position which he continued to occupy during his life. From May, 1896, to May, 1912, he was secretary of the board.

In 1892 he married Miss Louise Ramseyer, who died without children; he married his former wife's sister Helen in April, 1904; two sons survive him.

During his college course Mr. Rueter was quiet, industrious and earnest; work and play he undertook in the same simple and direct manner; he was, for instance, a thoroughly reliable and effective lacrosse player; and his record in study, alluded to above, shows many of the same characteristics.

Throughout his later life the qualities of his youth and early manhood were equally conspicuous. He was an efficient and conscientious trustee of this hospital; constant in attendance at the many board meetings; careful and thorough in his duties as its secretary; advocating and working steadily for those things which he believed to be of real value to the hospital, and utilized his legal training as an added factor in the worth of his work.

The senior staff expresses its sincere sorrow for his loss; it is a melancholy fact that, in spite of the skill of its surgeons and the care of its nurses, he died under the roof of the hospital he had served so long.

The staff also desires to place on record its thorough appreciation of the work he has done for the welfare of this institution,—work not yet completed when it was so abruptly ended by his too early death.

### INSTRUCTIVE DISTRICT NURSING ASSOCIATION.

THE Instructive District Nursing Association makes public a report of its work during the summer.

Its main contribution to the war has been to allow Miss Beard to spend a large amount of her time on various war committees. She is now serving on the Committee on Child Conservation of the State Department of Health; she is chairman of the Child Welfare Section of the Woman's Council of Defense of Massachusetts, and is on the section of that council which deals with nursing problems, and she is serving on three committees of the Council of National Defense: General Blue's Sub-Committee on Public Health Nursing, of which she is chairman, the Committee on Nursing of the General Medical Board, and the Committee on Home Nursing of Mr. Gompers' Committee on Labor. Her work on these committees and as President of the National Organization for Public Health Nursing, has made it necessary for her to spend a good deal of time in Washington and New York.

Two of its best nurses have positions as Child Welfare Supervisors, under the Committee on Child Conservation of the State Department of Health, and one of its best supervisors has left to work with the Red Cross. Miss Peabody, one of its vice-presidents, is vice-chairman of the State Committee on Child Conservation.

The increase in its work for the first six months of the year was unprecedented. This naturally has made it imperative to increase the number of the staff, and with the students, there are 101 nurses now working for the association. Miss Strong, the head of the educational department, who is in charge of the course in Public Health Nursing at Simmons College, has 10 students taking the eight months' course, and

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* Adopted at the meeting of the Senior Staff, Boston City Hospital, January 11, 1918.

25 taking the four months' course with the association, a larger number than ever before. Interest in public health nursing, instead of lagging behind, has been immensely increased, owing to the change of attitude of the Red Cross in regard to keeping public health nurses at public health work,—a policy which the Red Cross has now recognized as of great importance.

The association is continuing to take charge of all the patients in Boston given to it by the Harvard Commission on Infantile Paralysis. Unfortunately, because of the Harvard Commission's lack of funds, it is incumbent upon the association to raise the money for the extra expense of the work done by its nurses with paralyzed children.

The Health Center experiment in Hyde Park is developing well, and a contribution of $2400, from the Permanent Charity Fund of the Safety Deposit and Trust Company will permit further development by means of the addition of a dental clinic. By means of another $2400 given by the Permanent Charity Fund, it has been possible to establish a nurse at time of confinement in the Charlestown District, where the death rate of babies is astoundingly high.

A visiting housekeeper has been engaged, who will teach our patients how to plan and buy, and how to make the best use of food.

A press agent has secured for the association, greatly increased publicity in the Boston papers, and has prepared and sent out the first of a series of bulletins, which are to bring the work more graphically before the public.

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## RECONSTRUCTION AND RE-EDUCATION OF UNITED STATES SOLDIERS.

Joseph Colt Bloodgood, Chairman of Committee on Preparedness, Southern Medical Association, addresses the following letter:

To physicians and surgeons in industrial practice:

"I have received a large number of answers to the letters sent out dated September 10, 1917. These letters and personal conversation with physicians and surgeons in industrial practice seem to demonstrate that the number of cripples who need reconstruction and re-education is relatively so small, that even in large industries, it has not been considered of sufficient importance to develop the problem as will have to be done with the soldiers crippled in this war.

The Surgeon-General and the Department under Major Edgar King is preparing for the proper reconstruction and re-education of the crippled soldiers, but when this is accomplished, employment of some kind must be found for the soldier on his discharge, or the whole scheme fails.

The Government, naturally, must not only depend upon help in the re-education and reconstruction upon specially trained and qualified Medical Reserve Corps Officers, but upon the employers of labor in the great industries of this country, to find a job for which the crippled soldier has been re-educated and reconstructed.

It is my personal opinion that the problem is too large a one for any single industry to solve alone. The industries should combine as the railroads have combined in the settling of this very important war problem.

Although at the present time it is perhaps, one of the most difficult problems of the war, it is at the same time a peace problem.

In all the industries there must be many cripples in time of peace, who need reconstruction and re-education. For this reason, if the employers of labor coördinate with the Government now for the solution of this problem, they will establish and develop a scheme which can be utilized for the crippled men in industry in time of peace.

There is no doubt that 'safety first' has reduced the number of accidents. The improvement of first aid and its instruction, and the medical departments of the industries have greatly improved the results, but the question of re-education, especially for a better job, has not received the same consideration.

Please discuss this among yourselves and with the officers of your Company, and offer your combined advice and aid to the Surgeon-General of the United States Army and Navy."

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## COLD-PACK CANNING AND BOTULISM.

THE United States Department of Agriculture authorizes the following statement:

Botulism, often called sausage poisoning, is a specific intoxication brought about by *Bacillus botulinus,* an organism isolated by Van Ermengen from insufficiently cooked sausages which had caused a severe outbreak of food poisoning in Belgium in 1895. The symptoms (nausea, gastric pains, visual disturbances, muscular weakness, etc.) are caused by a definite toxin or poison produced by the *Bacillus botulinus* outside of the body.

The *Bacillus botulinus* is an anaerobic organism—that is, it grows in the absence of air. It grows readily at 20 to 25 degrees centigrade, but only sparingly at 37 degrees centigrade,—the temperature of the body, and there is no conclusive evidence that it produces its toxin to any extent in the digestive tract of animals. *Bacillus botulinus* does grow readily and produces its toxin in protein foods, such as meat or fish products. Some investigators state that it also produces its toxin readily in protein-containing vegetables, like peas, beans, and corn. When growing in these foods, the organism produces a very powerful poison which produces the symptoms mentioned above, or even death, when eaten in extremely small amounts. Fortunately, cases of botulism are not common in this country.

The *Bacillus botulinus* is a spore-forming organism, but both the organism and its spores are not very resistant to heat, the spores being killed by heating to 80 degrees centigrade for one hour. The toxin which the organism produces is also destroyed by boiling. Thorough cooking at the boiling temperature is, therefore, all that is necessary to kill the organism and destroy its toxin in the food, and cases of botulism are due to the eating of food which has been infected with the organism and not been sufficiently cooked. Sausages, which might become infected with this organism, present ideal conditions for its growth, and have been a frequent cause of botulism. From this fact the name of the disease is derived. Infected meat products and, in a few instances, canned vegetables and fruits have been given as causes of botulism.

Recently Dr. Dickson of San Francisco has reported* a study of eleven outbreaks of food poisoning, occurring during the past eighteen years in California, which he attributes to eating canned vegetables and fruits. In these cases no definite information is available as to the methods used in canning the vegetables, but it is reasonable to assume that the contamination of the goods might have been brought about by the selection of food of poor quality for canning, by lack of cleanliness in packing the products, by the neglect of some essential steps in the process, or by failure of the heat to penetrate to all parts of the can in sterilization.

There is no danger that the type of food poisoning known as "Botulism" will result from eating fruits or vegetables which have been canned by any one of the methods recommended by the United States Department of Agriculture, providing that such directions have been followed carefully, and that no canned goods are eaten which show signs of spoilage. In case of any doubt as to whether the contents of a particular can have spoiled, it should be thrown away. If fed to chickens or other animals, it should be boiled. No canned food of any kind which shows any signs of spoilage should ever be eaten. In the cold-pack method of canning given out by the Department of Agriculture, only fresh vegetables are recommended for canning, and sterilization is accomplished by the following processes: Cleansing, blanching, cold-dipping, packing in clean, hot jars, adding boiling water, sealing immediately, and then sterilizing the sealed jars at a minimum temperature of 212 degrees Fahrenheit for one to four hours, according to the character of the material. Since the spores of *Bacillus botulinus* are killed by heating for one hour at 175 degrees Fahrenheit† there is no reason to believe that the *botulinus* organism will survive such treatment.

The *Bacillus botulinus* has been found in the digestive tracts of some animals, especially the pig and the fowl, probably occurring there in the same manner as does the organism of tetanus (lockjaw) in the intestinal tract of the horse. It is not a parasite in the ordinary sense, but rather a saprophyte. From these sources it may be deposited on the soil, although attempts at isolating it from the soil have generally given negative results.

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* Jour. Am. Med. Assoc., Vol. lxix, pp. 966-968, No. 12, 1917.

† Rosenau, M. J.: Preventive Medicine and Hygiene, New York and London, 1917, 2 ed., p. 627; Jordan, E. O.: A Text-book of General Bacteriology, Philadelphia and London, 1916, 5 ed., p. 356; Park, W. H., and Williams, Anna W.: Pathogenic Microorganisms, New York and Philadelphia, 1917, 6 ed., p. 449.

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# THE MASSACHUSETTS VENEREAL DISEASE PROGRAM.

By Merrill E. Champion, M.D., Wollaston, Mass.

*(Continued from page 102.)*

In a previous issue of the Journal (January 17) so much of the venereal disease program of the State Department of Health as has to do with reporting methods was dealt with. The following article deals with:

Subject II—*Measures for Diagnosis and Treatment*. These may be subdivided as follows:

A. Measures for Diagnosis.

I. Clinical—At public clinics and through private physicians.

II. Laboratory—Microscopic examination of discharges for gonococci or spirochetes: and Wassermann tests of blood or spinal fluid, through the State and municipal laboratories.

B. Measures for Treatment.

I. Through public clinics.

II. Through private physicians.

### A. MEASURES FOR DIAGNOSIS.

Laboratory diagnostic facilities are now pretty generally available throughout Massachusetts. Smears are examined for gonococci at the State Diagnostic Laboratory at the State House, while Wassermann tests are performed free for physicians by the State Wassermann Laboratory at the Harvard Medical School. In addition to this, a number of cities maintain similar facilities for their own citizens. Certain of the larger clinics make examinations also for the treponema pallidum, and do complement-fixation tests for gonorreha. It is aimed, by means of further clinic facilities, to be mentioned later, to render possible for the smaller cities what has hitherto been confined to the largest.

### B. FACILITIES FOR TREATMENT.

Unfortunately, existing facilities for the accurate treatment of gonorrhea and syphilis are inadequate. Persons suffering from venereal disease go either to the private physician or to the quack, with the exception of those coming to Boston hospital clinics. The number of those going to quacks must largely outnumber those going to reputable physicians. Owing to the difficulty of obtaining salvarsan or its substitutes, and to the difficulties attendant on the administration of this drug, many persons needing specific treatment, in order to prevent them from being a menace to the public, have to go without.

According to an old law incorporated in the Revised Laws, Chapter 75, Section 41 (as amended by 1906, 365, Sec. 1), "Each city shall provide for the treatment, either in a hospital or as out-patients, of indigent persons who are suffering from contagious or infectious venereal diseases." Section 42 of the same chapter states that "No discrimination shall be made against the treatment of venereal diseases in the out-patient department of any general hospital supported by taxation, in any city in which special hospitals, other than hospitals connected with penal institutions, are not provided for the treatment of such diseases at public expense; but any such hospital may establish a separate ward for their treatment." In spite of this mandate, few cities have such facilities. The State Department of Health program contemplates facilities of this sort at various points throughout the State. The relationship of this Department to these clinics will center about the distribution of the arsphenamine, which the State is to manufacture and distribute.

A "State-approved clinic," under this scheme, will be one situated in the center of a district, so as to be easy of access. In the majority of instances, the most satisfactory housing for such a clinic will be a suitable hospital out-patient department. Close coöperation between clinic and local board of health will be indispensable. Arsphenamine will be furnished these clinics, both for their own use and for distribution to qualified practitioners of the district who may wish to use the drug in their own offices for their own patients. Preference will be given, however, to the needs of the clinic, and to those patients who are in an infective stage of their disease.

In charge of the "State-approved clinic" it is proposed to have a "Chief," who, in addition to supervising the work of the clinic, will act as the agent of the State Department of Health for the distribution of arsphenamine. The Legislature is being asked for an appropriation to be used to help in the financing of these clinics. It will probably be found advisable to make most of them more or less self-supporting by charging small fees for services to those who are able to pay.

The general public needs educating to the point where they will demand both careful diagnosis on the part of their physicians and adequate treatment. Such an attitude on the part of the public will be greatly to the advantage of the competent and reputable physician, who is willing properly to equip himself for the treatment of venereal disease. It is the province of the clinic to try to bring this about. Educational measures must, after all, receive most of the emphasis for years to come, if the venereal evil is to be controlled.

A most important feature of any clinic is its follow-up work. The greatest discretion is called for on the part of nurse or social worker, but is of corresponding value in preventing serious results to the patient himself or to his family, through neglect in carrying out his physician's instructions.

To summarize: The Department of Health plans to establish some fifteen "approved clinics" throughout the State, where adequate treatment for venereal disease may be had by those not able to pay anything, or able to pay only a small sum, for first-class care. Such clinics will have for their primary object the stamping out of venereal disease in its infective stages; more particularly syphilis, through the use of arsphenamine. These clinics will serve as foci for the distribution of arsphenamine to practising physicians, and, it is expected, as centers where physicians may send their patients for expert treatment, and where they themselves may come for instruction if they so desire. In a word, the object will be thorough diagnosis, better treatment, modern follow-up work, and closer coöperation with the practising physician.

## Correspondence.

### REPORTING OF ACCIDENTS FROM LOCAL ANESTHETICS.

*Mr. Editor:—*

The Committee on Therapeutic Research of the Council on Pharmacy and Chemistry of the American Medical Association has undertaken a study of the accidents following the clinical use of local anesthetics, especially those following ordinary therapeutic doses. It is hoped that this study may lead to a better understanding of the cause of such accidents, and consequently to methods of avoiding them, or, at least, of treating them successfully when they occur.

It is becoming apparent that several of the local anesthetics, if not all of those in general use, are prone to cause death or symptoms of severe poisoning in a small percentage of those cases in which the dose used has been hitherto considered quite safe.

The infrequent occurrence of these accidents and their production by relatively small doses point to a peculiar hypersensitiveness on the part of those in whom the accidents occur. The data necessary for a study of these accidents are at present wholly insufficient, especially since the symptoms described in most of the cases are quite different from those commonly observed in animals even after the administration of toxic, but not fatal doses.

Such accidents are seldom reported in detail in the medical literature, partly because physicians and dentists fear that they may be held to blame should they report them, partly, perhaps, because they have failed to appreciate the importance of the matter from the standpoint of the protection of the public.

It is evident that a broader view should prevail, and that physicians should be informed regarding the conditions under which such accidents occur, in order that they may be avoided. It is also evident that the best protection against such unjust accusations, and the best means of preventing such accidents consist in the publication of careful detailed records when they have occurred, with the attending circumstances. These should be reported in the medical and dental journals when possible; but when, for any reason, this seems undesirable, a confidential report may be filed with Dr. R. A. Hatcher, 414 East Twenty-Sixth Street, New York City, who has been appointed by the Committee to collect this information.

If desired, such reports will be considered strictly confidential so far as the name of the patient and that of the medical attendant are concerned and such information will be used solely as a means of studying the problem of toxicity of this class of agents, unless permission is given to use the name.

All available facts, both public and private, should be included in these reports, but the following data are especially to be desired in those cases in which more detailed reports cannot be made:

The age, sex, and general history of the patient should be given in as great detail as possible. The state of the nervous system appears to be of especial importance. The dosage employed should be stated as accurately as possible; also the concentration of the solution employed, the site of the injection (whether intramuscular, perineural or strictly subcutaneous), and whether applied to the mouth, nose or other part of the body. The possibility of an injection having been made into a small vein during intramuscular injection or into the gums should be considered. In such cases the action begins almost at once, that is, within a few seconds.

The previous condition of the heart and respiration should be reported if possible; and, of course, the effects of the drug on the heart and respiration, as well as the duration of the symptoms, should be recorded. If antidotes are employed, their nature and dosage should be stated, together with the character and time of appearance of the effects induced by the antidotes. It is important to state whether antidotes were administered orally, or by subcutaneous, intramuscular or intravenous injection, and the concentration in which such antidotes were used.

While such detailed information, together with any other available data, is desirable, it is not to be understood that the inability to supply such details should prevent the publication of reports of poisoning, however meagre the data, so long as accuracy is observed.

The committee urges on all anesthetists, surgeons, physicians and dentists the making of such reports as a public duty; it asks that they read this appeal with especial attention to the character of observations desired.

Torald Sollmann, *Chairman*,
R. A. Hatcher *Special Referee*,
*Therapeutic Research Committee of the Council on Pharmacy and Chemistry of the American Medical Association.*

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## SOCIETY NOTICES.

**Norfolk South District Medical Society.**—Stated meeting at United States Hotel, Boston, Thursday, February 7, 1918, at 11.30 a.m.

Dr. F. Russell Dame, of Braintree, will read a paper on "Septic Cases in Private Practice."

F. H. Merriam, M.D., *Secretary*,
South Braintree, Mass.

**New England Pediatric Society.**—A meeting of the New England Pediatric Society will be held at the Boston Medical Library on Feb. 1, 1918, at 8.15 p.m. The following papers will be read:

1. President's Address, Charles Hunter Dunn, M.D., Boston.
2. Clinical Spasmophilia, William W. Howell, M.D., Boston.
3. Experimental Studies on Growth after Feeding Certain Ductless Glands, Warren R. Sisson, M.D., Boston.

Charles Hunter Dunn, M.D., *President*.
Richard M. Smith, M.D., *Secretary*.

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## RECENT DEATHS.

**Edwin Lawson Farr**, M.D., died at his home in Brookline, January 24, 1918, at the age of 72. He was a graduate of the University of the City of New York, in 1873, and practised in Roxbury until 1915, when he moved to Brookline.

**Dr. Tanemichi Aoyama** of Tokio, Japan, an imperial court physician, died recently of nephritis. He was dean and professor of the medical college of the Tokio Imperial University, having held those offices since 1888. He was born in 1859, the third son of the late Kagemichi Aoyama, a Samurai of the Naeki clan.

**Albert H. Varney**, M.D., of Newfields, N. H., died recently at his home in that town. He was born at North Berwick, Me., on March 27, 1836, and graduated from Harvard Medical School in 1857. In 1860 he began practice in Newfields, N. H., and continued in his profession in that town and in Exeter, N. H., up to the time of his death. Dr. Varney was an assistant surgeon in the Second New Hampshire Regiment. He was elected to the Legislature from Newfields in 1871, serving one term. For 23 years he was town clerk and several times was selectman. His widow and three daughters survive him.

**John Alexander Gordon**, M.D., died at his home in Quincy, January 25, 1918, aged 74 years.

Dr. Gordon was born in New Perth, P. E. I., May 30, 1843, was educated in the public schools there and at the Prince of Wales College. He came to Boston in 1866 and entered Harvard Medical School, graduating in 1871. In 1870-1871 he was resident house physician at the Boston City Hospital. He came to Quincy in July, 1871, to practise, and had been a resident of that city ever since.

From 1872 to 1877, Dr. Gordon was town physician, and from 1884 to 1889 was chairman of the Board of Health. He was instrumental in having the Quincy City Hospital established in 1890, and had always been very much interested in its advancement and welfare.

Since 1891 he had been a trustee and chairman of the executive board, consulting physician, and on the medical and surgical staff of the hospital. Dr. Gordon was also interested for many years in developing a water works system for the city, and promoted the Quincy Water Works Company, now owned by the city. He was president of the company for many years, and for a time was also president of the Sharon and Marblehead Water Companies. He was elected to the School Committee in 1884 and served ten years.

Dr. Gordon was a member of Rural Lodge, A.F. and A.M.; St. Stephen's Chapter, R.A.M.; the Y.M.C.A., of which he was a director; the Granite City Club, the Quincy Yacht Club, the Megantic Fish and Game Association, the Boston City Hospital Club, the American Medical Association, and the Massachusetts Medical Society.

Dr. Gordon was unmarried. He is survived by two nephews and a niece.